

Fifteenth Report
1954 - 1956
OFFICE OF
THE STATE FORESTER

To
HONORABLE J. HUGO ARONSON
GOVERNOR
State of Montana



Gareth C. Moon, State Forester

Montana State Library



3 0864 1006 5217 4

Fifteenth Report
1954 - 1956
OFFICE OF
THE STATE FORESTER

To
HONORABLE J. HUGO ARONSON
GOVERNOR
State of Montana



Gareth C. Moon, State Forester

LETTER OF TRANSMITTAL

July 31, 1956
Forestry School Building
Montana State University
Missoula, Montana

Honorable J. Hugo Aronson
Governor, State of Montana
Helena, Montana

Dear Governor Aronson:

In accordance with the statutes of the State of Montana, there is transmitted herewith to you the Report of the Office of State Forester covering the fiscal years ending June 30, 1954, June 30, 1955, and June 30, 1956.

Very respectfully yours,

GARETH C. MOON, State Forester

INDEX

	Page
LETTER OF TRANSMITTAL.....	2
MEMBERS OF STATE BOARD OF LAND COMMISSIONERS.....	5
MEMBERS OF STATE BOARD OF FORESTRY.....	5
DEDICATION	6
INTRODUCTION	7
FORESTRY ADVISORY COMMISSION.....	8
OFFICE OF STATE FORESTER.....	9
FOREST MANAGEMENT	15
Timber Management	15
Forest Inventory	25
MONTANA STATE BOARD OF FORESTRY.....	27
COOPERATIVE FOREST MANAGEMENT PROGRAM.....	31
FOREST PROTECTION	33
Fire Protection	33
Slash Disposal	35
Fire Protection Organization.....	41
Clarke-McNary Law, Section 2.....	42
Fire Prevention	47
Disease	48
Insects	50
OTHER LAND USES.....	53
WATERSHEDS	56
BUILDING PROGRAM	59
MONTANA RURAL FIRE FIGHTERS SERVICE.....	62
TIMBER RESOURCE REVIEW.....	67
ORGANIZATION CHART OF OFFICE OF STATE FORESTER.....	10
OFFICE OF STATE FORESTER, STATEMENT OF APPROPRIATIONS AND EXPENDITURES.....	14
RECEIPTS FROM TIMBER SALES AND LAND RENTALS.....	19
SAWTIMBER CUT, BY COUNTIES.....	21
CHRISTMAS TREE SALES.....	23
DISTRIBUTION OF INCOME FROM STATE FOREST LAND.....	24
ACREAGES OF STATE FOREST LAND.....	26
FORESTRY BOARD, STATEMENT OF APPROPRIATIONS AND EXPENDITURES	30
SLASH DISPOSAL SUMMARY.....	38
SLASH DISPOSAL TABLE SHOWING AREA AND VOLUME CUT.....	39
COLLECTIONS AND DISBURSALS OF FUNDS FOR SLASH DISPOSAL	40
ACREAGES OF STATE AND PRIVATE FOREST LANDS IN ORGANIZED FIRE PROTECTION DISTRICTS.....	42
TEN-YEAR FIRE STATISTICS FOR MONTANA.....	44
COOPERATIVE WORK FUNDS, COLLECTIONS AND EXPENDITURES	45
FORESTRY BOARD COLLECTIONS AND ALLOCATIONS FOR FIRE CONTROL	46
MONTANA RURAL FIRE FIGHTERS SERVICE, BUDGET.....	64
FIRE REPORT, MONTANA RURAL FIRE FIGHTERS SERVICE.....	65
STATISTICAL TABLES TAKEN FROM THE TIMBER RESOURCES REVIEW	67



Digitized by the Internet Archive
in 2013

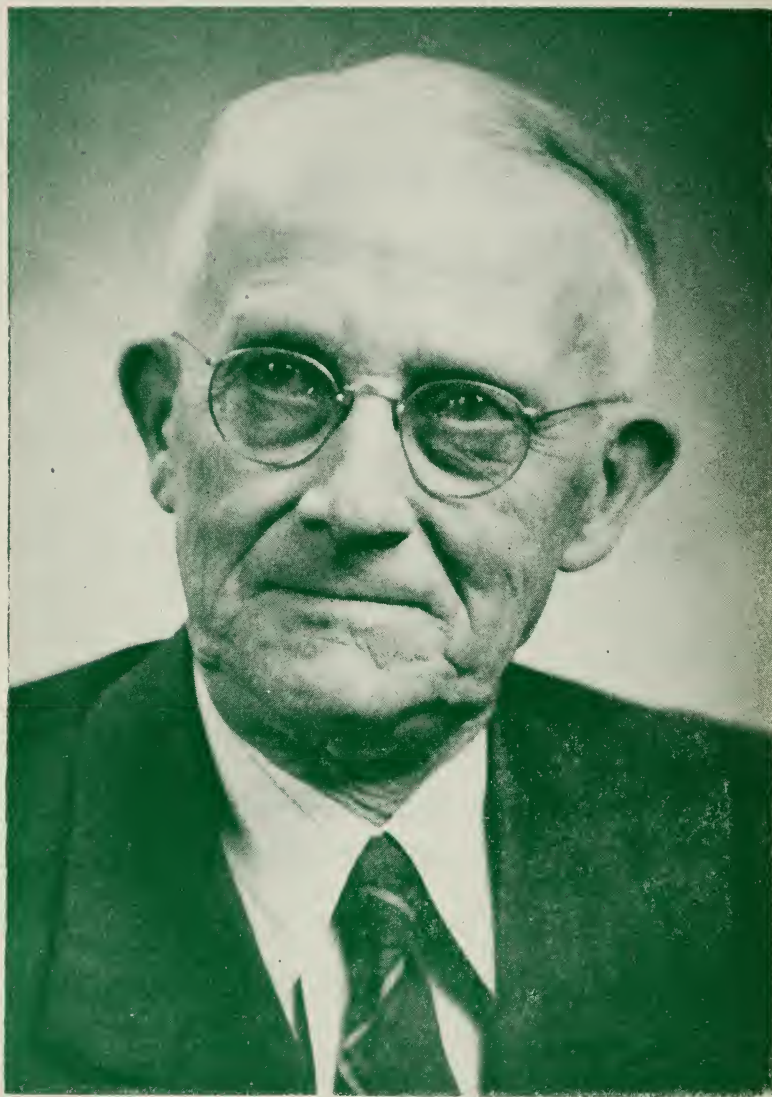
MEMBERS OF THE STATE
BOARD OF LAND COMMISSIONERS

GOVERNOR J. HUGO ARONSON.....Chairman, Helena
MARY CONDON.....Superintendent of Public Instruction, Helena
S. C. ARNOLD.....Secretary of State, Helena
ARNOLD OLSEN.....Attorney General, Helena
LOU E. BRETZKE.....Secretary and Commissioner of State
Lands and Investments, Helena

(SAM MITCHELL, Secretary of State, served on the Board until his death in May, 1955)

MEMBERS OF THE STATE BOARD OF FORESTRY

GOVERNOR J. HUGO ARONSON.....	Chairman, Helena
D. A. FABRIC.....	Choteau
P. D. HANSON.....	Missoula
GEORGE NEFF	Bonner
GEORGE NEILS	Libby
SYLVAN J. PAULY.....	Deer Lodge
ROSS WILLIAMS	Missoula
HOLLIS YOUNG	Creston



L. L. WHITE

DEDICATION

To the old timer in the Montana State Forestry Department, this Biennial Report of the Office of State Forester is dedicated. L. L. White—a forester long before most of the present employees of the Office of State Forester were born—brought twenty years of forestry experience with him when he came to Montana State Forestry Department on May 1, 1925.

On June 30, 1956, L. L. White tried his best to retire, but being 75 years young, so well informed on the history of forestry in Montana, and so able to keep abreast of rapid developments, L. L. is now the Department's consultant—and working harder than ever.

INTRODUCTION

Realization of the real values inherent in the forests of Montana is increasing at astounding speed. Owners of small forested areas, private companies with larger ownerships, federal and state forest land administrative agencies, all are acutely aware of the complexity and immensity of the problems complicating proper forest management. Although different types of ownerships exist to fulfill different fundamental purposes, each is rapidly becoming increasingly aware of pressures resulting from increasing market demands, keener competition, growing local populations, improved travel facilities, and additional leisure time. These pressures are not all local, either. Montana forest influences are felt to the mouth of the Columbia River on the Pacific Ocean, and to the delta of the Mississippi on the Gulf of Mexico. Increasing requirements for timber, growing use by the public, and inter-relationships with other sections of our nation provide reason enough for thousands of individuals and hundreds of organizations, representing all walks of life and many different interests, to be concerned with the management of Montana's forests. Montana's forest lands are vital, not only to Montana, but to the Nation.

Lumbering is a major industry in Montana, surpassed only by agriculture and mining. The annual value of forest products is in excess of \$38,000,000. This figure does not include such values as conservation of soil and water, recreation, food and protection for wildlife.

The area of forest land in Montana is 24,238,000 acres consisting of 8,808,000 acres non-commercial, and 15,430,000 acres of commercial forest land. Of the commercial forest land, 10,605,000 acres are in federal ownership, 4,043,000 acres are in private ownership, 146,000 acres are in county ownership, and 536,000 acres are in state ownership. With 150,000 acres of non-commercial forest land in state ownership, the total acreage of state-owned forest land is 686,000 acres.

To allow Montana's forest lands to continue to produce wealth in the form of continuing crops of forest products, abundant useable water, and matchless outdoor recreation areas, the Office of State Forester during the past biennium has begun development of a forestry program of long range policies based on factual and scientific information. A definite effort is made in this report to include detailed and fundamental material as background for the development of this program.

FOREST ADVISORY COMMISSION

In response to the fifth joint Senate Resolution of the 33rd Legislative Assembly, Governor J. Hugo Aronson appointed a Forestry Advisory Commission to make a study of the state-owned forest resources and to present a report to the 34th Legislative Assembly. Members of the Commission were Ross Williams, Missoula, Chairman; A. L. Helmer, Polson; and George Neff, Missoula. Twelve recommendations were made by this group:

1. A complete inventory of the state-owned timber should be initiated.
2. A proper timber cutting policy should be established as soon as reliable information can be obtained regarding the amount and condition of the state-owned forest resource. In the interim a temporary cutting policy should be aimed at controlling epidemic outbreaks of tree-killing insects and salvaging the timber killed; salvaging windthrow and fire killed timber; and centering sale of overmature timber in areas that do not interfere with continued salvage in the problem areas.
3. State timber holdings should be consolidated within the boundaries of the established state forests. New forests should be designated in the eastern part of the state where consolidation may be made.
4. The development and maintenance of a permanent record system should be undertaken.
5. The State Forester's biennium budget should be supported to facilitate the proper administration and protection of the State's 60 million dollar investment in standing timber and forest land.
6. Necessary legislative action should be taken to provide funds to be used for the protection of state-owned forests where abnormal situations develop, such as fire, insect and disease infestations, and blowdown.
7. Support should be given the State Forester's plan for the reorganization of the office and field force.
8. A statement of principles to be used as the basis for making appraisals of all state timber before it is offered for sale should be adopted.
9. The Montana Rural Fire Fighters Service should be separated from the Office of State Forester.
10. Approval should be given the principle of setting aside assessments as a timber stand improvement fund with defined and definite limitations.
11. The State should place the same emphasis on the control of destructive insect infestation as it does in meeting the destruction of state-owned timber by forest fire.
12. Montana laws relating to forestry should be recoded, and immediate consideration given to the amendment of 13 existing statutes.

The Commission prepared its report with the collaboration and assistance of the State Forester and the State Board of Forestry. Action was taken by the State Board of Land Commissioners, the State Board of Forestry, the 34th Legislative Assembly, and the State Forester to bring about the changes recommended.

Immediate benefits have resulted in the actions taken. Some of the recommendations are bringing, and will bring, about long range benefits.



Ponderosa pine on the Sula State Forest.

THE OFFICE OF STATE FORESTER

Responsibilities

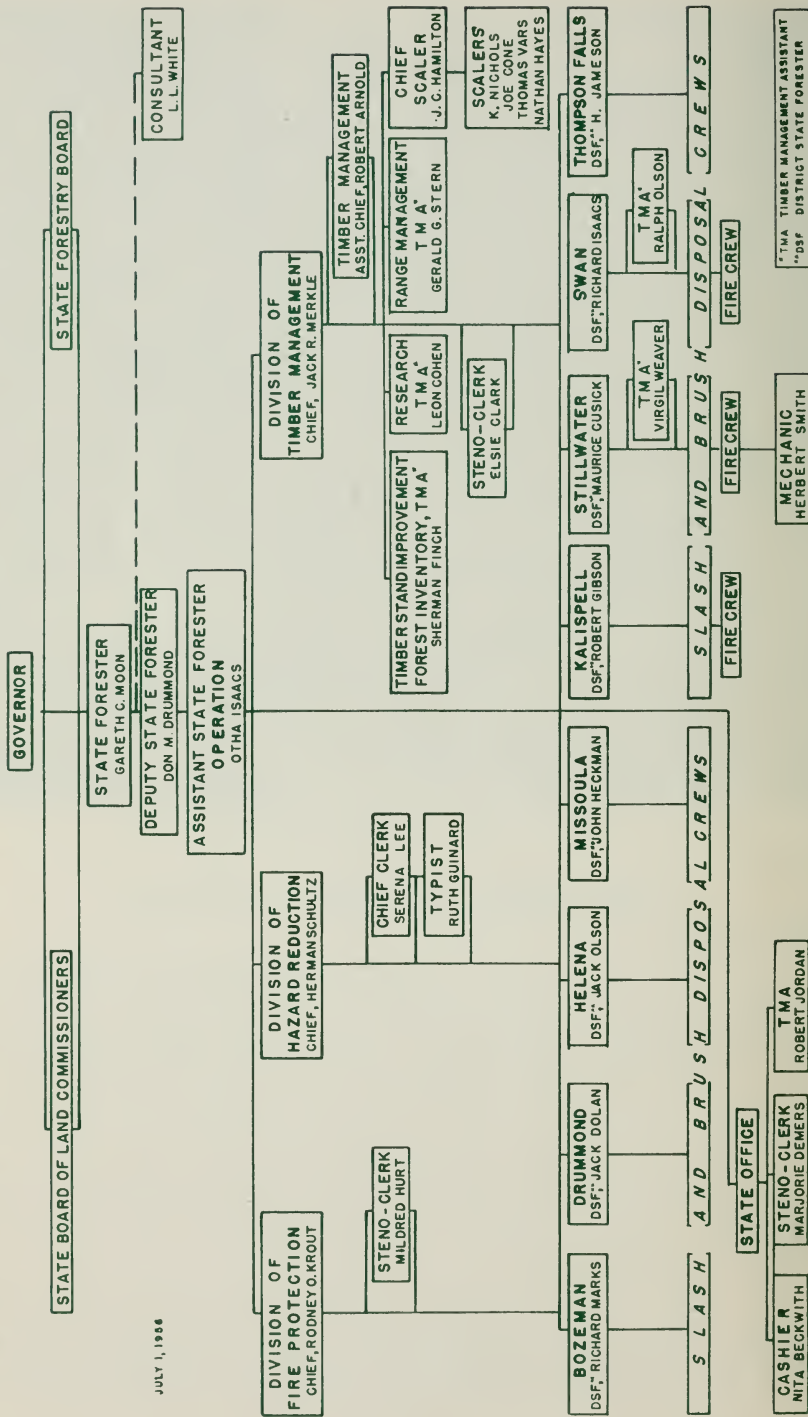
Under the laws of the State of Montana responsibility for management of the state-owned forest lands is delegated to the State Forester through the State Board of Land Commissioners. Revenues which have averaged approximately \$1,000,000 annually during the past five years, derived from the sale of products from, or the lease of, these lands are deposited in the State Treasury according to the purpose for which the land was originally granted the state.

Likewise, responsibility for cooperation with private forest land owners in development, protection, and conservation of the forest, range and water resources is delegated the State Forester through the Montana State Board of Forestry.

Location

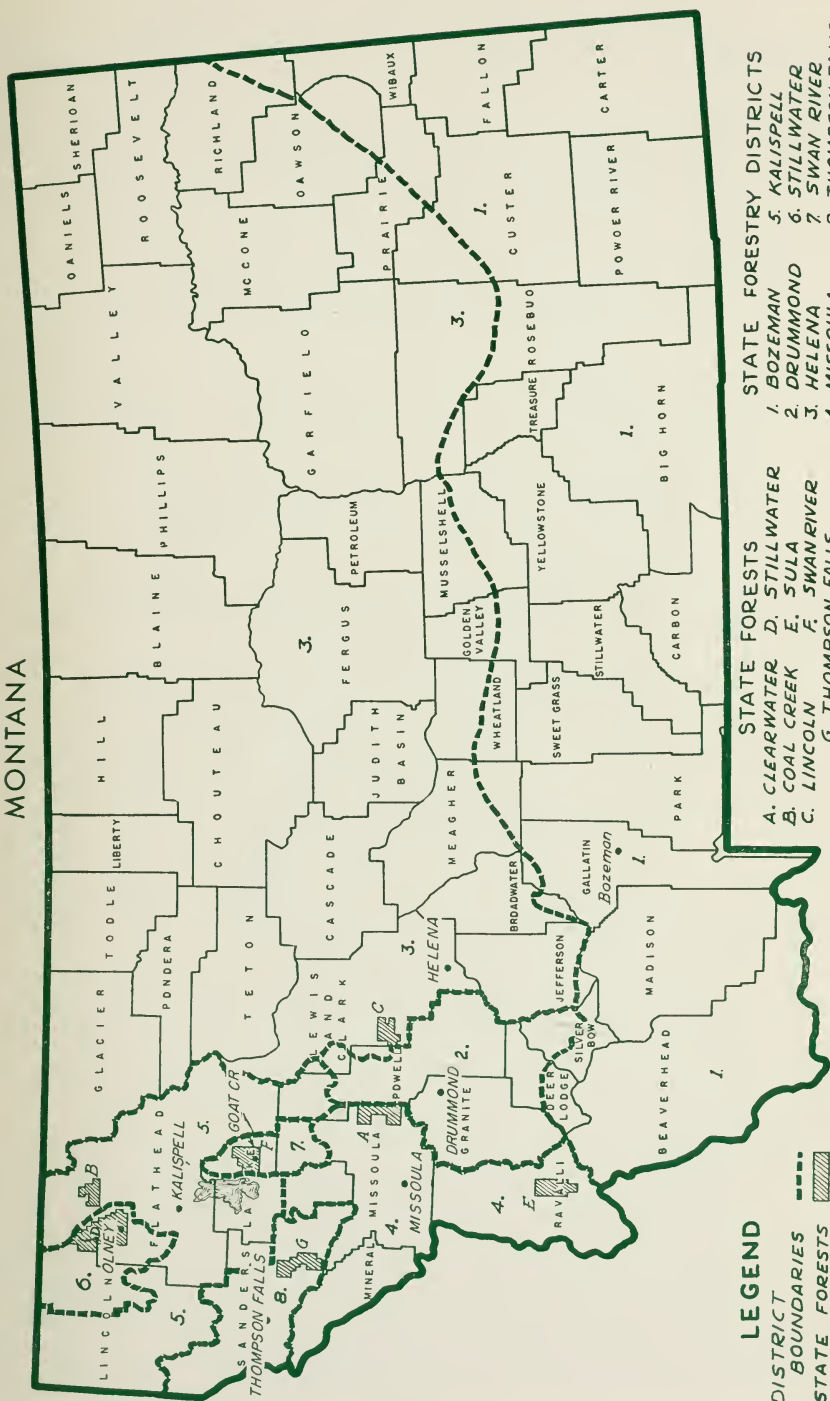
The Office of State Forester is headquartered in the Forestry School Building on the Montana State University Campus in Missoula. Operation, Forest Protection, and Timber Management activities have been centralized in the Missoula office. The Hazard Reduction (Slash Disposal) activities are

ORGANIZATION CHART OF THE OFFICE OF MONTANA STATE FORESTER.



JULY 1, 1934

MONTANA



OFFICE OF STATE FORESTER—(Continued)

managed from the Kalispell office. Kalispell is also the headquarters for the assistant chief of timber management.

Office Force

The office force of the Department consists, in Missoula, of one cashier in charge of financial and inventory records, one timber management stenographer-clerk, one receptionist-stenographer, and one typist-records clerk. One chief clerk and one stenographer-typist are assigned the Kalispell office.

Organization

During the biennium special emphasis has been placed on the reorganization of the Office of State Forester to group various functions into divisions. The work in any one division is now the responsibility of one individual. The divisions are:

1. **Operation**, headed by the Assistant State Forester whose responsibilities include fiscal procedures and records, personnel management, and general office management;
2. **Fire Protection**, headed by a chief, whose responsibilities include activities related to the forest fire control program as they apply, directly, to state-owned forest lands, and, cooperatively, to privately owned forest lands;
3. **Hazard Reduction**, headed by a chief, whose responsibility it is to conduct the slash disposal programs on state and privately owned lands; and,
4. **Timber Management**, headed by a chief, who is responsible for the timber management program on state-owned forest lands.

The Deputy State Forester has the responsibility of assisting in planning, organizing, directing, revising, and coordinating the activities of the Department. The State Forester, of course, is responsible for the overall administration of the state forestry program. (See chart on page 10.)

In order to more efficiently carry out the forestry work, the state has been divided into eight districts, with a District State Forester in charge of each District. Headquarters for the Districts are located in Bozeman, Drummond, Helena, Missoula, Kalispell, Stillwater (Olney), Swan River (Goat Creek), and Thompson Falls. (See map on page 11.)

As of June 30, 1956, the Office of State Forester consists of 35 permanent employees—29 men and 6 women. Of the 29 men, 15 have degrees in Forest Management, and one each has a degree in Pathology, Journalism, and Business Administration. It is important that the Office of State Forester obtain and train competent men to handle forest activities of the Department.

Office Procedures

New procedures have been worked out for many of the office operations. Most of these will be mentioned in connection with the activity to which they apply. However, several of a general nature will be mentioned here.

A complete new filing system has been adopted which has eliminated much of the confusion in the keeping of department records. The system of fiscal control is being revised and is being made more efficient. The methods and procedures of placing equipment and supply orders has been standardized, as have been the reporting methods within the Department. Antiquated office equipment is gradually being replaced with modern, efficient machines. A card

OFFICE OF STATE FORESTER—(Continued)

property inventory system, correlating the needs of the State Land Office and the Office of State Forester has been devised and placed in operation.

The use of a new land-record card system has been installed which shows the complete history of each parcel of state-owned forest land under the jurisdiction of the Office of State Forester by section, township, and range. A white card has been designed as a special use record which shows the rights-of-way, improvements, grazing, cabin site leases and other special uses. A yellow card shows the slash disposal record, trespass cases, timber stand improvement work undertaken, and forest productivity index. A third card, blue, shows the forest resources inventory record. By filing the three cards together, current, as well as historical, information is readily available.

Programs

On state-owned forest lands the Office of State Forester is charged with the responsibility of general overall management. Activities in this connection include:

1. **Timber Management**—Timber inventory, cruising, appraisal, marking, and preparation and supervision of timber sales in such manner as to leave state-owned forest lands producing to maximum capacity for future income.
2. **Special Uses**—Management of special uses of state-owned forest lands such as grazing leases, cabin site leases, rights-of-way, and special uses.
3. **Brush Disposal**—Management of the slash disposal (fire-hazard reduction) program on state forest lands following logging operations.
4. **Forest Protection**—Control programs for fire, insects and disease.
5. **Timber Stand Improvement**—Work done on the more productive state-owned forest lands to enable future crops to be produced more quickly.

On privately-owned forest lands the State Forester cooperates with many public and private agencies in the development, protection and conservation of the forest, range and water resources.

The programs include:

1. **Forest Fire Protection**—Supervision of the Forest Fire Control program in cooperation with Private Fire Protective Associations under Section 2 of the Clarke-McNary Law.
2. **Forest Fire Prevention**—Cooperation with the Cooperative (Smokey Bear) Fire Prevention Campaign and the "Keep Montana Green" program.
3. **Slash Disposal**—Supervision of the slash disposal (fire-hazard reduction) program on privately-owned lands following logging operations.
4. **Montana Rural Fire Fighters**—Supervision for this cooperative fire control program made up of all agencies within Montana with land management responsibilities, and the rural fire organizations.
5. **Insect Control**—Cooperation with federal and private landowners in the control of two forest insects which have been epidemic during the past few years—the spruce bark beetle and the spruce budworm.
6. **Cooperative Forest Management**—Administration of a program designed to assist the small forest land owners in setting up management plans for small forest holdings, and to aid small producers of primary forest products in increasing the efficiency of their operations.

OFFICE OF STATE FORESTER

STATEMENT OF APPROPRIATIONS AND EXPENDITURES

		Appropriation	Disbursed	Forward	Revert to Gen. Fund
<u>Biennium, July 1, 1953—June 30, 1955</u>					
Administration					
Salaries					
	FY 1954	\$28,300.00	\$28,300.00	.....
	FY 1955	28,300.00	28,300.00		.....
Capital, Repairs					
	FY 1954	2,100.00	2,100.00	.....
	FY 1955	1,575.00	1,575.00		.....
Operation and Replacements					
	FY 1954	3,170.00	3,169.89	.11	
	FY 1955	3,170.00	3,710.11	.....	.....
P. E. R. S.					
	FY 1954	2,900.00	3,739.09	.....	.....
	FY 1955	2,900.00		.....	.....
	Suppl. Appr.	2,025.00	4,086.91		.....
Protection of State Lands					
	FY 1954	30,847.00	30,728.68	64.32	
	FY 1955	30,847.00	30,911.32		.....
Timber Sales					
	FY 1954	62,000.00	59,801.79	\$ 2,198.21	
	FY 1955	62,000.00	64,198.21		.....
Budworm and Bark Beetle Administration					
	FY 1954	2,952.00	2,927.46	24.54	
	FY 1955	.....	.....		24.54
<u>Fiscal Year 1956, July 1, 1955—June 30, 1956</u>					
Administration					
Salaries	\$26,765.00	\$26,764.53	.47		
Maintenance & Operation..	2,382.00	2,378.58	3.42		
PERS	6,262.00				
& use of FY 1957 as needed	500.03	6,762.03	.....	
Capital Outlay	1,950.00	1,862.87	87.13		
Repairs & Replacements....	150.00	120.84	29.16		
Protection of Lands					
Insect Control	25,000.00	16,634.36	8,365.64		
Salaries & Wages.....	20,215.00	20,214.60	.40		
Capital Outlay	2,880.00	2,442.63	437.37		
Repairs & Replacements..	2,500.00	1,650.22	849.78		
Maintenance & Operation	25,200.00	25,197.40	2.60		
Forest Resources					
Inventory	10,000.00	10,000.00	.....	
Timber Sales					
Salaries	72,650.00	72,648.94	1.06		
Capital Outlay	1,178.00	495.67	682.33		
Maintenance & Operation	16,013.00	16,010.50	2.50		



Truck Loading.

FOREST MANAGEMENT

Forest Management is the application of technical forestry knowledge to forest properties in such manner that the highest volume of mature crops may be harvested in the shortest time, commensurate with the maintenance and/or improvement of soil and watershed values. Good forest management is based upon an inventory of the growing stock and present and future plans for protection from destructive agents. Because Forest Management can be divided into two activities which may be carried on quite independently of one another, we divide Forest Management into Timber Management, which includes the growing and harvesting of the tree crop, and Forest Protection, which covers the protective measures taken to provide the forest the opportunity to grow to harvest time.

TIMBER MANAGEMENT

Good forest management needs to be based on an inventory of the forest stand. An inventory of the forest lands in state ownership west of the Continental Divide was made during the 1920's and early 1930's. This inventory, made according to methods considered modern for that time, included data only on merchantable timber, and did not include any information regarding growing stock, growth rate, insect and disease conditions, or vigor of the stands. The Office of State Forester has undertaken the project of inventorying the state-owned forest resources. The first area to be inventoried, the Swan State Forest, was completed in July, 1956.

Until the forest inventory of the State Forests has progressed to the point where it can supply sufficient data with which to compute an annual allowable cut, timber sales will be confined to insect and disease infested, and to over-mature, stands. The policy of harvesting overmature timber has been followed only in those areas, and during such times, that the operations did not interfere with salvage cutting in the insect-infested areas.

Intensive insect surveys made it possible to observe, plan, and initiate action against insect infestations. By the end of 1956 all of the known state-

owned spruce bark beetle infested timber will have been surveyed and contracted for sale as salvage cuttings.

Timber Cutting Practices

Normally, as an individual tree in the forest approaches overmaturity it becomes more susceptible to attacks by insects and disease which will cause its death. A tree in this condition has ceased to grow and if allowed to remain in the stand will, through decay, become commercially valueless. By removing it, the area and soil nutrients may be better utilized by younger, more vigorous growing stock. In effectively applying salvage harvest methods, comparatively light cuts per acre are made over more extensive areas.

In shallow-rooted spruce-type stands of mature and overmature age, the selective type harvest is not practical as thinned or disturbed timber stands of this species are very susceptible to wind-throw. By harvesting this timber in clearcut blocks or strips arranged in such manner as to leave undisturbed tracts of timber within seed dispersion distance, perpetuation of the forest through natural reseeding is assured by seed produced by the timber left standing. This system is being applied on steep mountain slopes in the form of alternating leave strips and clearcut strips, to assure proper reseeding and to minimize soil erosion.

Wherever natural destructive forces have destroyed seed sources, hand or machine planting must be relied upon to restock the stand.

Timber Sales

During the biennium the Office of State Forester has revised the method of making timber sales. Two types of sales are made by the Department—contract and permit.

On all timber contract sales scaled bids are received. The sale is awarded the highest qualified bidder.

The timber permit sales are non-competitive. Small volumes of timber, under 100 M board feet, which are so isolated from additional state timber as to make impractical its sale under competitive bidding are sold in this manner. Occasionally a tract of timber suffers attack by insect infestation, fire or wind-throw. It then becomes necessary to remove the timber immediately in order to realize its top value before blue stain and decay set in, and to eliminate the risk of fire and insect breeding areas. This timber is sold under the permit system, providing that the sale volume is less than 200 M board feet and no possibility of a competitive sale exists. In neither case are timber permits issued where competition is anticipated nor are they ever issued to avoid competitive bidding.

Basic minimum values by species on all timber harvested on all timber sales and timber permits are computed by timber appraisal procedures fair and equitable to the purchaser and to the State of Montana. Costs of harvesting and lumber market values are acquired through cooperation with the lumber industry, the U. S. Forest Service, and other agencies dealing with lumber marketing.

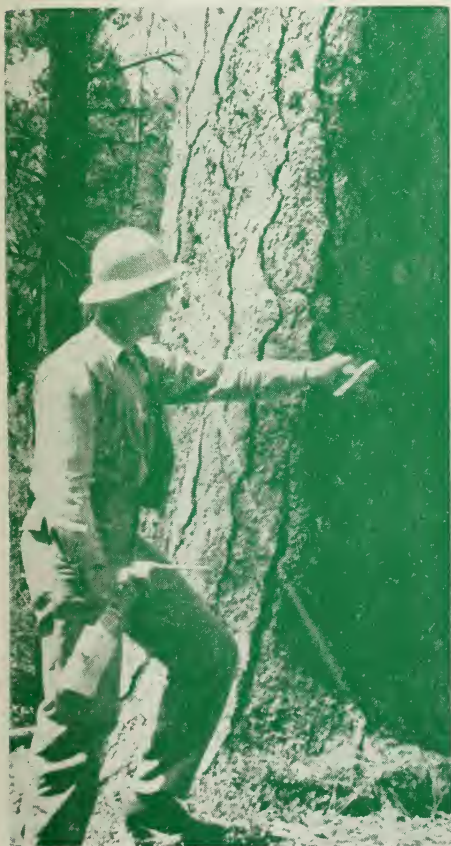
Timber sale contracts have been expanded during the past biennium to include new items which encourage better forest practices, reduction of waste, with less damage to the producing site to leave a more productive stand.

By planning and preparing balanced timber sale work-loads for the State Forest Districts, more "on the ground" supervision is being provided to assist

the timber harvester in carrying out provisions of timber sale contracts and permits.

Timber marking standards have been adopted and applied to the sale of overmature timber. By the standards the selection of harvest products is determined by tree crown form and bole defect characteristics. Harvests made in this manner are leaving state forest lands stocked with vigorous, low mortality risk trees. Timber in this condition is good growing stock, with high seed source potential and insect repelling resistance. The harvest areas retain the valuable vegetative cover which maintains soil, watershed and game cover values.

Minimum standards for logging road construction have been adopted to provide adequate road systems in the consolidated forest lands for better future management and protection. Specifications are designed to meet different situations. Particularly in the case of removal of timber on scattered State lands, standards are not so high as on the consolidated areas where future use of roads will be intensive.



Timber marker selecting a tree to be harvested.

The products of the state-owned forests are scaled by state-employed personnel. Scaling standards are checked by a check scaler who maintains timber scaling quality and uniformity throughout the organization. When differences are noted, additional instruction or other corrective measures are taken. In no case does the Office of State Forester accept the scale of other than state-employed scalers. Timber scale reports are made in duplicate in order that one copy may be given the purchaser.

On small sales, where it is not practical to employ a scaler even on a part time basis, the tree scale method may be used. Net volume is obtained by sample scaling a proportional amount of the gross volume throughout the sale area to derive a representative cull and breakage factor, which is applied to the gross volume. Tree scale is not nearly so accurate as log scaling and is not used except in those cases where arrangements cannot possibly be made to scale the logs on the trucks or in log decks.

Timber Sale Preparation

The area designated for harvest is inspected by the Timber Management Section to determine the desirable cutting method. The District State Forester then assists in locating lines, marking timber and laying out roads. Upon the completion of the mechanics of the timber sale, the Timber Management Section and District State Forester together prepare a sample contract with a prospectus of the timber sale for study by prospective bidders. Timber Management Section, after appraisal to establish minimum stumpage rates by tree species, submits the proposed timber sale for approval by the State Board of Land Commissioners. After Board approval, the timber is advertised for sale. Working areas have been developed within which all prospective bidders are notified. Upon awarding the sale to the highest competent, bonded bidder, the District State Forester is made responsible for on-the-ground supervision. Official closure of the sale and release of bond, is made after it has been deter-



Logs are scaled with a Scribner Decimal C rule to determine board feet volume.



Trees left on an area after logging put on more growth and insure reseeding of the area.

mined by the District State Forester and the Timber Management Section that requirements of the sale contract have been met.

Other Forest Products Sale Procedure

Posts, poles, and fire wood permits are handled by the District State Foresters, who accept applications, prepare the permits, administer and supervise the sales to completion. The Timber Management Section assigns a list of available rates which the District State Foresters use to determine prices to the buyers.

Christmas tree sales are handled much in the same manner as the sale of posts and poles. Permits, however, are issued by the Timber Management Section because sales to big companies who may be purchasing trees from scattered areas, can be more efficiently handled from the central office.

Undertaking the harvest of timber under a sound management program is regarded as the first step toward perpetual harvest on state forest lands. After forest inventories are complete the amount of normal annual growth and mortality occurring on state forest lands will be computed. The annual harvest and the rate of salvage harvest can then be ascertained. At such a time the annual harvest revenue to the school funds of Montana will become more or less constant.

RECEIPTS FROM TIMBER SOLD AND LAND RENTALS FROM STATE FOREST LAND

Fiscal Year	Timber Sales	Timber Permits	Land Rentals	Totals
1954.....	\$906,187.40	\$ 70,742.97	\$ 15,598.64	\$992,629.01
1955.....	845,187.91	51,891.54	15,242.85	912,322.30
1956	588,850.04	63,277.09	15,424.05	667,551.18

STATE SAWTIMBER CUT (Board Feet) FROM STATE FOREST
LANDS—FISCAL YEAR 1954

County	Ponderosa Pine	Fir and Larch	Spruce	White Pine	White Fir	Lodgepole Pine	Cedar	Birch	Total Green	Total Dead
Flathead	195,000	13,676,000	9,120,000	1,496,000	414,000	173,000	98,000	1,000	52,173,000	672,000
Lincoln	3,770,000	6,619,000	159,000	12,000	99,000	154,000	6,000	.....	10,819,000	324,000
Missoula	1,775,000	7,220,000	102,000	.....	8,000	.....	.....	.....	9,105,000	.....
Mineral	5,704,000	2,419,000	85,000	.....	.....	.....	.....	.....	8,208,000	.....
Sanders	4,285,000	3,623,000	32,000	.....	.....	.....	.....	.....	7,940,000	.....
Ravalli	914,000	3,043,000	280,000	.....	.....	.....	.....	.....	4,237,000	.....
Lake	733,000	2,902,000	29,000	13,000	.....	134,000	51,000	.....	3,862,000	57,000
Lewis & Clark	1,274,000	237,000	.....	.....	.....	.....	.....	.....	1,511,000	.....
Powell	26,000	922,000	134,000	.....	.....	.....	.....	.....	1,082,000	.....
Musselshell	107,000	.....	.....	.....	.....	.....	.....	.....	107,000	.....
Bighorn	57,000	.....	.....	.....	.....	.....	.....	.....	57,000	.....
Totals	18,840,000	40,661,000	9,941,000	1,521,000	521,000	461,000	155,000	1,000	72,101,000	1,053,000

STATE SAWTIMBER CUT (Board Feet) FROM STATE FOREST
LANDS—FISCAL YEAR 1955

County	Ponderosa Pine	Fir and Larch	Spruce	White Pine	White Fir	Lodgepole Pine	Cedar	Total Green	Total Dead
Flathead	186,090	11,471,280	10,137,120	1,465,480	579,170	73,280	194,790	24,107,210	1,044,500
Lincoln	565,510	8,423,070	2,072,490	3,840	63,010	16,770	.....	11,144,690	261,290
Ravalli	1,508,810	7,674,370	999,680	.....	76,190	.....	.....	10,259,050	145,110
Lake	513,440	7,774,260	723,410	433,830	20,870	233,330	6,880	9,706,020	211,570
Missoula	1,107,820	7,221,740	116,910	.....	3,160	.....	.....	8,449,630	24,880
Powell	286,930	4,579,500	2,990	.....	.....	.....	.....	4,869,420	.....
Sanders	1,133,820	2,554,110	13,670	340	.....	880	.....	3,702,820	.....
Mineral	1,133,300	459,200	26,630	57,220	2,370	.....	310	1,679,030	16,030
Lewis & Clark	645,670	523,250	.....	.....	.....	.....	.....	1,168,920	.....
Granite	500	244,890	2,060	.....	430	870	.....	248,750	5,010
Fergus	31,580	.....	.....	.....	.....	.....	.....	31,580	.....
Totals	7,113,470	50,925,670	14,094,960	1,960,710	745,200	325,130	201,980	75,367,120	1,708,390

STATE SAWTIMBER CUT (Board Feet) FROM STATE FOREST
LANDS—FISCAL YEAR 1956

County	Ponderosa Pine	Douglas Fir	Larch	Spruce	White Pine	White Fir	Lodge- pole Pine	Cedar	White Bark Pine	Cotton- wood	Total Green	Total Dead
Lake	908,070	3,124,550	8,854,710	422,200	264,740	60,250	229,580	74,090	.....	580	13,938,770	511,280
Flathead	907,630	1,817,890	3,929,940	5,864,510	243,777	338,760	132,490	177,680	.....	.....	13,412,670	793,920
Missoula	3,028,580	5,625,850	3,449,390	146,350	.....	8,530	6,630	.....	.....	.....	12,265,330	214,280
Lincoln	564,270	496,590	526,610	1,614,670	1,560	81,380	33,390	16,030	8,190	.....	3,342,690	639,230
Granite	2,780	1,901,430	480	26,880	.....	3,060	8,920	.....	.....	.....	1,943,550	2,780
Powell	152,170	1,202,990	.....	12,580	.....	.....	.....	.....	.....	.....	1,367,740	21,530
Ravalli	653,480	393,920	237,290	.....	.....	510	.....	.....	.....	.....	1,285,200	20,290
Sanders	248,560	54,820	140,520	.....	.....	.....	.....	.....	.....	.....	443,900	17,260
Lewis & Clark	54,410	5,540	.....	.....	.....	.....	.....	.....	.....	.....	59,950	.....
Musselshell	100,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	100,000	.....
Gallatin	.....	27,570	.....	.....	.....	.....	2,410	.....	.....	.....	29,980	.....
Mineral	2,820	780	.....	.....	.....	.....	.....	.....	.....	.....	3,600	.....
Totals	6,622,770	14,651,930	17,138,940	8,087,190	510,07	492,490	413,420	267,800	8,190	580	48,193,380	2,220,570

CHRISTMAS TREE HARVEST FROM STATE FOREST LANDS

County	No. of Permits	No. of Bales	Unit Average Price	Stumpage
F. Y. 1954				
Flathead .....	....	12,638.74	....	.....
Lake .....	....	6,442.74	....	.....
Lincoln .....	....	7,247.37	....	.....
Missoula .....	....	4,901.26	....	.....
Ravalli .....	....	4,807.37	....	.....
Sanders .....	....	2,848.42	....	.....
Granite .....	....	1,732.63	....	.....
Powell .....	....	825.26	....	.....
Mineral .....	....	.....	....	.....
Total .....	....	41,443.79	....	\$16,667.75
F. Y. 1955				
Flathead	45	13,651.1	.51	6,975.66
Lake	26	6,816.9	.46	3,144.62
Lincoln	16	5,767.7	.46	2,675.33
Missoula	8	7,584.2	.38	2,894.11
Ravalli	3	2,129.0	.37	787.11
Sanders	3	2,882.1	.37	1,066.49
Granite	1	138.5	.37	51.26
Powell	2	117.4	.37	43.50
Mineral .....	....	.....	....	.....
Total	104	39,086.90	....	\$17,638.08
F. Y. 1956				
Flathead	23	13,162.23	.48	6,327.12
Lake	12	2,027.16	.50	1,005.76
Lincoln	11	11,075.47	.60	6,649.92
Missoula	13	3,645.54	.54	1,979.23
Ravalli	2	902.02	.57	513.73
Sanders	8	6,800.52	.46	3,160.21
Granite	1	44.00	.44	19.36
Powell	2	226.00	.40	90.14
Mineral	3	461.00	.44	202.40
Total	75	38,343.94	....	\$19,947.87

DISTRIBUTION OF INCOME FROM STATE FOREST LANDS

Fiscal Year	Total	Montana State College	Montana State College Morrill	Deaf and Blind School	Industrial School	Normal School	School of Mines	University	Common School	E. Mont. Normal School
INCOME FUNDS*										
1954.....	\$ 13,298.89	\$ 243.19	\$ 1,536.43	\$ 776.87	\$ 165.66	\$ 287.92	\$ 1,275.51	\$ 265.00	\$ 8,460.40	\$287.91
1955.....	18,094.76	230.35	1,512.87	809.72	229.16	328.55	1,037.72	265.00	13,352.85	328.54
1956.....	15,420.05	272.03	1,610.37	716.42	108.86	261.88	1,594.00	265.00	8,133.29	261.86
PERMANENT FUNDS*										
1954.....	\$823,746.70	\$31,926.05	\$90,845.09	\$ 6,488.91	\$ 534.29	\$ 609.82	\$ 6,854.87	.....	\$686,487.67	.....
1955.....	818,921.46	6,816.24	81,108.02	1,945.53	1,736.54	21,086.11	10,635.77	.....	695,593.25	.....
1956.....	555,020.66	2,277.52	33,087.56	991.63	809.30	947.98	5,139.05	.....	513,963.95	.....
CAPITOL BUILDING FUNDS*										
1954.....	\$155,483.42									
1955.....	75,306.08									
1956.....	97,110.47									

*INCOME FUNDS: 90% allocated to schools and other state institutions; 10% of these funds credited to PERMANENT FUNDS.

*PERMANENT FUNDS: Interest only on these funds expendable.

*CAPITOL BUILDING FUNDS: 100% expendable upon deposit.

FOREST INVENTORY

Swan River State Forest Inventory

The Swan River State Forest inventory was begun in July 1955. Ten thousand dollars was appropriated to be used during the first fiscal year of the biennium.

Because the ownership is intermingled state and private with the bulk of the privately owned timber in the ownership of the Northern Pacific Railway Company, the State Forester and the Northern Pacific Railway Company agreed to a mutual assistance inventory program. The Northern Pacific Railway Company flew and photographed the area, helped train State Forestry personnel in photogrammetry, and permitted the use of expensive photogrammetry equipment. Employees of the State Forestry Department conducted the field type mapping, established the control points, and conducted the ground surveys. The cooperative method under which this project was conducted permitted savings to both the Northern Pacific Railway Company and to the Office of State Forester.

The equipment necessary for interpreting aerial photographs was purchased. Mapping and timber typing occupied the winter months. During the spring of 1956 permanent sample plots were established throughout the area. A preliminary recording plan was prepared. Plot data was recorded in a manner suitable for use in automatic business machines.

Upon completion, this inventory will provide the basis for sound forest management in the Swan River State Forest.

Inventory Elsewhere

In order to make a more accurate determination of the State of Montana's ownership in the way of forest land, and in order to re-classify some lands as forest lands now classified as grazing lands, the Office of State Forester has constructed a map showing the official forest land acreage by counties. Data for this map was supplied by the State Land Office. The records of the State Land Office are not in agreement with the forest survey data as determined by the U. S. Forest Service, nor do they agree with the acreages for which the state is paying fire protection. The Land Board record shows an ownership of 470,213.36 acres of forest land. However, the State is paying fire protection on 498,110.40 acres, or 27,897.04 acres more than the State's classified forest land acreage. In addition, 24,420.48 acres of forest land are not classified as forest land and are not within organized fire protection districts. Apparently, Montana owns 52,317.52 acres more forest land than is presently classified as such.

During the past year, the Office of State Forester has been able to examine some of this land, but has not had time to complete the investigation to ascertain what portion of the 52,317.52 acres should be reclassified as forest land. It is planned that the Chief Land Agent and the State Forester will conduct a survey of the lands in question and make a joint recommendation to the State Board of Land Commissioners for reclassification of those portions of the 52,317.52 which are in reality forest lands.

The Forest Survey shows that Montana owns some 658,999 acres of forest land or approximately 188,786 acres more than can be accounted for by State

records. The following questions must be answered in order to determine why this discrepancy exists between the Forest Survey and the Land Board figures:

1. What portion is error in the Forest Survey due to mathematics?
2. What portion of the forest land included in the Forest Survey figures as state-owned, is owned by the Department of Fish and Game and other State Departments?
3. What portion is now classified as grazing land, which should be reclassified as forest land?

The State Forester has also prepared, during the biennium, a set of county maps showing the total forest land ownership in each county. A list is now being prepared of the state-owned lands which have been cruised but which have never been reclassified. These inventory investigations are making us more and more aware of the need for a clear-cut definition of forest land, written into the law, as is the case with grazing lands.

STATE-OWNED FOREST LAND (1952) (Thousand acres)

Total Forest Lands .....	.....	.....	686
Commercial Forest Land.....	.....	536	.....
Western Montana	446	.....	.....
Sawtimber	200	.....	.....
Young Growth	227	.....	.....
Not restocking satisfactorily	19	.....	.....
Eastern Montana	90	.....	.....
Sawtimber	30	.....	.....
Young growth	57	.....	.....
Not restocking satisfactorily	3	.....	.....
Noncommercial Forest Lands .....	.....	150	.....
Western Montana	40	.....	.....
Eastern Montana	110	.....	.....

(Compare these figures, as compiled in 1952 by the Office of State Forester with those appearing in the Timber Resources Review, excerpts of which are printed in this report, beginning on page 67).

MONTANA STATE BOARD OF FORESTRY

"For the purpose of protection and conservation of forest resources, forest range and water, of regulation of stream flow, and of prevention of soil erosion, and for the further purpose of more adequately promoting and facilitating the cooperation, financial and otherwise, between the State of Montana and all of the public and private agencies with which it is now or later may be associated in such work, there is hereby created the Montana State Board of Forestry . . ."

With the aforesaid charge and responsibility, the Montana State Board of Forestry has carried on an envious record during its existence. This Board is composed of Governor J. Hugo Aronson, Helena, Ex-Officio Chairman, and seven additional members as follows:

1. D. P. Fabrick, Water Conservation Board, Choteau.
2. George Neff, Blackfoot Forest Protective Association and Northern Montana Forestry Association, Bonner.
3. Sylvan J. Pauly, Montana Stock Growers Association and Montana Woolgrowers Association, Deer Lodge.
4. Hollis Young, Montana State Grange, Montana Farm Bureau Federation and the Montana Farmers Union, representative farm woodland owner, Creston.
5. George Neils, Montana Lumber Manufacturers Association, Libby.
6. Ross Williams, Dean of Montana School of Forestry, Missoula.
7. P. D. Hanson, Regional Forester, Region 1, U. S. Forest Service, Missoula.

The past three years have been extremely active years for the Forestry Board. Their responsibility for fire and insect protection plus many other details of forestry as it applies to the privately owned lands has necessitated many meetings of the board as a group or as sub-committees.

1 9 5 3

The fire protection assessment list of the ten western counties (Flathead, Granite, Lake, Lewis and Clark, Lincoln, Mineral, Missoula, Powell, Ravalli, Sanders) involving approximately 6,000 owners, were approved by the Board.

A report of the spraying of the spruce bark beetle infestation in Lewis and Clark and Jefferson counties was made by a representative of the U. S. Forest Service. Spraying of 117,000 acres commenced on July 10, 1953, and was completed in twelve days. 63% of the area sprayed was federal land, 35% was private land, and the remaining 2%, or 1,852 acres, was state land. The most difficult portion of the spraying program was soliciting the private land owners share, particularly the small and absentee land owners.

The Board recommended that the forest fire season time limitation be increased to 60 days.

The Board voted unanimously to incorporate in Rule No. 11 of Forestry Board Rules and Regulations that "all diesel powered equipment in which the exhaust stack is pointed upward shall be exempt from being equipped with spark arresters."

The Montana Rural Fire Fighter Service was commended by resolution in which the Board of Forestry recognizes the service for a splendid performance and commended it for the principles by which it operates.

The Board recommended that the booklet "Laws of Montana Relating to Forestry" be brought up to date.

1 9 5 4

January 26, Special Meeting

Action was taken by the Board to revise the forest fire protection agreement with the Flathead Indian Reservation.

Governor Aronson requested the Board members to review applications for the position of State Forester and stated that he would welcome the recommendations of the Board.

August 26, 1954—Annual Meeting

The fire protection assessment list of the ten western counties (Flathead, Granite, Lake, Lewis and Clark, Lincoln, Mineral, Missoula, Powell, Ravalli, Sanders) were approved by the Board.

The Forestry Advisory Commission made a progress report on their study of the forestry needs in Montana. Mr. George Gustafson, Coordinator, for the Montana Rural Fire Fighter Service, gave a report on the activities of the group for the past year. He pointed out that in 1953, there were only 13,000 acres reported as being burned in the area protected by the Service which was an especially good record in considering the hazardous nature of the fire season. The State Forester presented a progress report from the State Forester's Office and his plans for reorganization. These plans had been approved by the State Board of Land Commissioners on July 30, 1954. He reported in detail on the needs of the Department in its Timber Management Program, particularly with the emphasis on necessary statute amendments, the slash disposal problems and fire control. The Board authorized the State Forester to turn over slash monies to protection agencies where slashing has gone 18 months without treatment.

The Board of Forestry increased the assessment rate to 5c for the fiscal year 1955.

A resolution commending Mr. Clarence Strong for his work in Montana was approved.

The Attorney General's Office reported to the Board that land exchanges on the basis of full market value for full market value were legal and surely within the Statutes.

A complete summary of the insect infestation in Montana was reported to the Board by the Chief Entomologist of the Inter-Mountain Forest and Range Experiment Station.

October 14, 1954—Special Meeting

The Board of Forestry approved the raising of the assessment rate for all lands protected by U. S. Forest Service on the Kaniksu, Coeur d'Alene, (parts of the old Cabinet), Lolo, Kootenai, Flathead and Bitterroot forests from 4c to 5c per acre.

Mr. Ross Williams, Chairman of the Forest Advisory Commission, gave a progress report of this Commission. Forest survey for State Forest lands, the insect situation, State Forester's Biennium budget, timber sale appraisals, record system, integration of the Rural Fire Fighter Service, and inventory, were discussed in detail.

November 5, 1954—Special Meeting (Continuation of the October 14 meeting)

Further discussion in regard to the report of the Forest Advisory Commission contained such items as cutting the budget, inventory, insect infestations. Proposed amendments to forestry laws were discussed in detail with the Board taking action to approve each recommended amendment. Arrangements were made for the State Board of Land Commissioners and the Forestry Advisory Commission to meet for the purpose of the Advisory Commission making its report as required by the law.

1955

April 26, 1955—Special Meeting

The spruce budworm situation in Montana was discussed in detail. It was pointed out that Montana was faced with a very serious infestation of spruce budworm and that action must be taken to stop the spread of this insect. After considerable discussion the State Forester recommended that the zones of this infestation as shown on a compared map be declared as Zones of Infestation, which was approved by the Board.

The State Forester was authorized to join cooperatively in the aerial spraying of the spruce budworm in the areas designated as the Gardiner (19), Bitterroot (10), and the Swan (11).

The State Forester presented a plan which would provide State assistance to small forest land owners in technical forestry problems. He pointed out that there were 14,516 small owners of 2,730,000 acres of forest land and that he wished to provide this service to the land owners under the terms of the Cooperative Forest Management Act, which provides federal funds to assist in this work. The Forestry Board enthusiastically endorsed this program.

August 26, 1955—Annual Meeting

The fire protection assessment list of the ten western counties (Flathead, Granite, Lake, Lewis and Clark, Lincoln, Mineral, Missoula, Powell, Ravalli, Sanders) were approved by the Board.

After hearing the report on the Montana Rural Fire Fighter Service, Governor J. Hugo Aronson read and presented a framed citation commending Mr. Gustafson for the service he performed during the past years. The new Coordinator, Mr. Carter V. Rubottom, made a report on the activities of the service.

A report on the spruce budworm situation was made and thoroughly discussed. A report on the action taken by the State Legislature showed that all the laws recommended by the Forestry Advisory Commission were passed with the following exceptions:

The inventory law did not pass, but \$10,000 was included in the State Foresters' appropriations; the insect bill was not passed, but \$25,000 was

included in the appropriations; a third law (not presented by the Advisory Commission), pertaining to the renaming of the State forests was not passed.

The State Forester made a comprehensive report of the activities of the State Forestry Department for the past two years.

1956

February 28, 1956—Special Meeting

The State Board of Forestry approved the formation of the Swan River State Fire Protection District. This area comprises 10,177 federally owned acres, 20,000 privately owned and 38,781 acres, state owned. The State Forestry Department will provide fire protection to this area commencing July 1, 1956.

The Civil Defense Rural Fire defense problem on non-forest, non-watershed rural areas was discussed. The State Forester was instructed to request an opinion from the Attorney General regarding the legality of the Office of State Forester participating in Civil Defense activity on privately owned, non-forest wild lands.

Spruce budworm spraying program was discussed in detail. Reported fish mortality on the Yellowstone River brought up considerable discussion as to whether or not insect sprays were responsible for such mortality. The proposed spraying program for 1956 season was discussed and the State Forester was authorized to proceed with a proposed program. This proposal included working together with the State Fish and Game Biologist in making studies concerning spray effects on fish. The Board took action to extend the boundaries of the Zones of Infestation to include areas not formerly included.

Proposed legislation and activities dealing with forest land taxation were discussed in detail.

STATEMENT OF APPROPRIATIONS AND EXPENDITURES OF THE MONTANA STATE BOARD OF FORESTRY

Fiscal Year	Appropriation	Expenditures	Fwd. to FY 1957
1954	\$1,500.00	\$1,500.00	.....
1955	1,500.00	1,500.00	.....
1956	1,500.00	.....	.....
	.....	.....	192.80

COOPERATIVE FOREST MANAGEMENT PROGRAM



CFM foresters work out forestry problems with the owner on his land.

OBJECTIVES

Three-fourths of the Commercial forest land in the United States is privately owned. The Cooperative Forest Management Act is aimed at helping to establish more productive management on those privately owned forests with special emphasis on the more than 4 million small properties. It is also aimed at aiding some 50,000 small sawmill operators and other processors of primary forest products to improve manufacturing techniques and plant efficiency.

In the meeting of April 28, 1955, the Forestry Board approved the agreement between the Office of State Forester and the U. S. Department of Agriculture, Forest Service, whereby the Office of State Forester will be reimbursed up to fifty percent of the cost of the program by monies made available for the purpose by federal appropriation. There are more than 14,000 small private forest land holdings, and more than 300 small sawmills in Montana. The Cooperative Forest Management Program is designed to furnish these owners and operators technical advice on the management of their forest lands and the improvement of their manufacturing methods.

The Office of State Forester has two District State Foresters (Service Foresters), one in Bozeman and one in Helena, assigned largely to work on this program.

TECHNICAL FOREST MANAGEMENT ADVICE

The CFM program furnishes the small private landowner with technical advice on the management of his land for forestry purposes. Professionally trained foresters meet with the land owner out on his land and give on-the-ground advice as to its management, and help him draw up simple forest management plans. They teach the owner to select and mark trees to be cut, estimate timber volume, determine proper cutting methods, market forest products, plant, thin, and protect his timber stand from fire, insects and disease. To the small operator they offer advice and assistance on selection of mill and processing equipment, mill lay-out, and the application of approved operating methods.

QUALIFYING AREAS AND OWNERSHIPS

The technical assistance provided for under the Cooperative Forest Management Act is restricted to woodlands or potential woodlands (i.e., plantable areas), including shelterbelts. Areas with horticultural or ornamental tree problems will not qualify under the terms of the CFM Act.

Forest Management services provided under this program are restricted to privately owned woodlands, but both farm and non-farm forests are included. Land owned by organizations such as the YMCA, 4-H Club Camp Associations and Boy Scouts of America qualify for service under this Act; State forests, county-community-town and public school forests are publicly owned and cannot qualify for this service.

The Cooperative Forest Management Act places no restrictions on size of ownership, but it is understood that the Act is directed mainly at small forest owners and small processors of primary forest products.

Service assistance to processors of forest products is restricted by the Act to processors of primary forest products. These are interpreted to be forest materials in the round, such as sawlogs, poles, piling, pulpwood and veneer bolts. Processors of primary forest products are those who take the first steps in conversion of these primary products to manufactured articles; sawmills, pole treating plants, veneer mills, shingle mills and the like. Service to processors may be provided whether the raw material is from private or public land.

COOPERATION WITH PRIVATE FORESTERS

Most of the work carried out under this program involves small forest properties where the owners want to do their own forestry work. In instances where the kind of work, or more usually the amount of work required by some forest owners, indicates the desirability of the landowner employing a full or part-time forester. In such cases the landowner is advised of this fact and given assistance in locating a qualified private forester. In doing this, care is taken to recommend only competent men; at the same time, equal care is taken not to show particular favoritism.

No hard and fast line can always be drawn between what is proper for public foresters and what is possible for private foresters to do. As the CFM program develops in Montana, a determination will be made of an approximate maximum limit for the amount and kind of assistance to be provided free of charge by service foresters to a single landowner.

GENERAL

To date the Service Foresters in Montana have had to spend a considerable amount of their time in determining where the qualifying forest lands are located in the state. Working relationships with the Extension Service, the Soil Conservation Service, the Agricultural Conservation Program and the U. S. Forest Service have been worked out. To June 30, 1956, the Service Foresters have, in addition, given assistance to 14 owners on 11,846 acres of privately owned forest land involving 28½ million board feet. History of this program in many other states has been one of a rapid increase in calls for assistance as soon as the program is established. Montana is entering that phase of the CFM program during the summer of 1956.

FOREST PROTECTION

Forest Protection is the term applied to all activities designed to protect the forest from injurious agents such as fire, insects, and disease. All forest land owners, and the State of Montana is no exception, are faced with the problems of providing measures to protect present investments and future harvests. The forester has obligations in this field to the state forests, and, cooperatively, to the forests in private ownership. The many organizations involved in the program of protecting private lands makes it necessary that the problems in connection with forest protection be handled in no different manner on private lands than on state-owned lands.

FIRE PROTECTION

Fire Protection is made up of all activities pertaining to the handling of the forest fire problem. The manner in which these activities are administered is influenced by the land ownership pattern. In the State of Montana, land ownership may be divided into three main categories: federally owned, privately owned, and state owned. The Office of

State Forester is responsible for forest fire protection, directly, on state owned forest lands, and, cooperatively, on privately owned forest lands. Financing for the state fire protection program is derived from three sources: (1) for state owned forest lands, state appropriation; (2) for privately owned forest lands, assessments made on the privately owned classified forest land; and (3) federal Clarke-McNary, Section 2, funds which supplement fire protection on both state and privately owned forest lands. Federal agencies, of course, handle fire protection on federally owned lands.

Forest fire protection associations—The Northern Montana Forestry Association, the Blackfoot Fire Protective Association, and the Anaconda Fire Protection Service—handle the fire protection program on the majority of privately owned forest lands in western Montana. The Montana Rural Fire Fighters Service—volunteer organization—handles it in the rural areas for the areas east of the Continental Divide. Revenue with which to operate the Associations is derived from assessments made on the privately owned forest land within



Lookout on Dog Mountain keeps watch for fires on the Stillwater State Forest.

the association boundaries and Clarke-McNary funds assigned through the Office of State Forester.

From an administrative angle, state owned forest lands are of two types—those that are in blocked ownership, and those that are in scattered ownership. Where the state lands are in large block ownerships, such as in the Stillwater State Forest, the Swan State Forest, and the Big Fork area, it is most economical to provide protection directly; where the ownership is scattered it is more economical for the Office of State Forester to pay the various protection associations and agencies to protect those state lands located within the boundaries of their units.

Under various agreements, involving payments from one protection agency to another, or an occasional exchange of area protection responsibilities, the several protection agencies are providing the most protection for the least cost.

Fire Prevention

Fire prevention consists of all activities to prevent forest fires from starting. Prevention is accomplished by reducing the hazards, making and enforcing proper fire prevention laws, licensing certain operations likely to cause fires, and through public education.

SLASH DISPOSAL



In certain areas tractors provide a cheaper and quicker means of piling logging debris for burning.



Hand piling is still used to clean up the smaller logging jobs and along the main-traveled highway routes.

Slash—debris left after logging operations such as branches and tree tops—is a serious fire hazard until it decays or is treated. In order to reduce the risk of a fire starting in dry slash it is necessary that it be disposed of or dispersed in such manner that it will not carry fire.

Slash disposal is fire hazard reduction on forest lands following logging operations.

Slash Disposal on Privately Owned Lands

The law governing slash disposal provides for the collection of, or the expenditure by the operator of, 75¢ per thousand board feet of timber cut from privately owned lands within the state. The money so collected is expended by the Office of State Forester for treating the slash on the particular operation from which it is collected. If the operator prefers to do the slash disposal work himself, the deposit is returned to him after he has completed the job to the satisfaction of the state slash inspector. In August, 1955, the Office had 1,439 open cases. 663 of these were for jobs amounting to \$30.00 or less.

Beginning January 1, 1955, all State Forestry records pertaining to slash disposal were transferred to the State Forestry Office in Kalispell under the supervision of the Chief of Hazard Reduction. Approximately \$125,000 yearly is collected and allocated to the slash disposal program on private lands. To collect and expend these funds, the Chief of Hazard Reduction has the assistance of a full-time clerk and part of the time of each District State Forester, between 80 and 100 seasonal foremen and laborers, a mechanic, and three dozer operators. Suburban type vehicles have been acquired in which to transport crews to and from the slash disposal jobs. In addition, power saws and other equipment necessary has been and will be purchased.

Thirty-six to 50 percent more coverage for a given cost can be realized through the use of machinery than by hand methods on areas suitable to the use of motorized equipment. It is planned that the use of heavy equipment will be increased in the hazard reduction program.

In addition to work done by State crews in hazard reduction, we are now contracting with operators and landowners to do their own slash disposal work.

A major problem in the handling of work pertaining to slash disposal accounts is found in jobs amounting to \$30.00 or less, or less than two man-days work. Some of this problem has been eliminated through contracting the work to the operator. Occasionally in cases where the amount of money is too small to allow the State to perform the hazard reduction work necessary on a given area, the money is turned over to a fire protection agency for additional protection. This is not a satisfactory solution because it only shifts the responsibility from one agency to another and does not solve the problem.

In cases where the operator elects to do the slash disposal job himself, he is given 18 months in which to do it.

It is difficult to perform a satisfactory job of slash disposal for 75c per thousand board feet cut, especially on the smaller cuttings. Consequently, it is cheaper for the operator to turn the slash disposal job over to the Office of State Forester. Especially is this true on second growth areas being cut for studs and pulpwood, where the volume of slash is great in comparison to volume cut. Among the most promising solutions to the problem is the increasing of the slash fee to an amount which will induce the operator to do the work himself, or if turned over to the Office of State Forester, furnish enough money with which to do a satisfactory job.

Fire hazard reduction work in slash disposal consists of the following steps:

- (1) The cutover area is examined and the most suitable method of disposal is determined, keeping in mind that the greatest amount of fire hazard reduction for the money available, without serious damage to the uncut timber and reproduction, is the goal.
- (2) Methods used:
 - a. Piling and Burning. Approximately 55% is done along roads, around landings, mill sets, along skidding trails, cutting boundaries and wherever there is a concentration of slash.
 - b. Lopping and scattering. Approximately 35%. Lopping and scattering of slash has increased considerably within the last three years, due principally to the lighter cut per acre and the increase in the number of slash jobs having a smaller amount of money on deposit than in previous years. Also the re-cutting of potential Christmas tree areas where burning is not advisable.
 - c. Road fire line construction and road improvement. Approximately 10%. Fire lines are dozed to mineral soil, 10 to 50 feet wide, free of all brush, logs, grass and small trees. The wider fire lines are built along the cutting boundaries with narrower lines crosscutting the areas to break them into small units. Road construction and

improvement consists mostly of reconditioning existing roads, improving skidding trails and fire lines to make them useful as truck trails and access roads.

(3) Percentage of area covered by each method used.

On the average, if the lop and scatter method is used, 40% of the area is treated. If dozer piling is used, 25% of the area is treated, and if hand piling is done, 15% of the area is covered.

Of the total slash disposal work done and paid for from slash disposal deposits, approximately:

62% is paid for labor.

25% is paid for operators and landowners who do their own work.

10½% is paid for dozer tractor work.

2½% is paid to protection agencies for added protection.

Recommendations

- a. Slash disposal rates should be increased to not less than \$1.00 per thousand feet board measure to offset the increase in costs of disposal since the 1949 slash law was passed.
- b. New slash legislation, eliminating conflicting parts of the present law should be drawn to more definitely define the responsibilities of the operator and the purchaser.
- c. The operator should be required to furnish the State Forester with more complete information than the present slash law requires.
- d. Handpiling and burning should be continued on roadside cleanup and other areas of heavy concentrations of slash where it is impractical to use machinery.
- e. Because it is more economical, and provides better seed beds for natural reseeding machinery should be used wherever possible.
- f. Lopping and scattering should be continued on areas of light cuts, of small slash deposits, where Christmas tree culture is practiced and where burning is unnecessary.

SLASH DISPOSAL SUMMARY

F. Y. 1954

71 slash clearances issued for inspections made involving:
9,213 acres upon which was cut
17,058,149 bd. ft. sawlogs, lumber and cants
222,190 bd. ft. switch ties
135,092 pcs. cross ties
3,497.08 cds. pulpwood
47,497 lin. ft. poles and piling
averaging 2.81 M ft. cut per acre

F. Y. 1955

119 slash clearances issued for inspection made involving:
81,882 acres upon which was cut
36,559,628 bd. ft. sawlogs, lumber and cants
450,519 bd. ft. switch ties
505,901 pcs. cross ties
4,897.45 cds. pulpwood
5,560 lin. ft. poles and piling
averaging 3.43 M ft. cut per acre

F. Y. 1956

95 slash clearances issued for inspections made involving:
38,253 acres upon which was cut
45,518,758 bd. ft. sawlogs, lumber and cants
164,213 bd. ft. switch ties
115,819 pcs. cross ties
12,264.51 cds. pulpwood
1,114,963 lin. ft. poles and piling
557 posts
averaging 1.56 M ft. cut per acre
*averaging 2.91 correct average

Summary F. Y 1954, 1955, 1956

285 slash clearances issued for inspections made involving:
66,348 acres upon which was cut
99,136,535 bd. ft. sawlogs, lumber and cants
836,922 bd. ft. switch ties
756,812 pcs. cross ties
20,659.04 cds. pulpwood
1,168,020 lin. ft. poles and piling
577 post
averaging 2.27 M ft. cut per acre
*True averaging 3.11 M ft. cut per acre

*NOTE: F. Y. 1956 report does not indicate a fair average cut per acre for sawlogs, lumber and ties for the reason a large acreage was involved in the cutting of poles and pulpwood of very light cut. If one item of 18,976 acres involving 1,670.10 cds. pulpwood and 1,019,811 lin. ft. poles was omitted, the average cut per acre would be 2.91 M bd. ft.

SLASH DISPOSAL TABLE SHOWING AREA AND VOLUME IN BOARD FEET LOG SCALE CUT

Fiscal Years Cut 1954-1956

	Acres	Percentage	Volume M. Bd. Ft.	Percentage
Slash Taken Care of by				
Private Operators	93,418	41%	413,123	50%
Slash Taken Care of by				
State Crews	132,138	59%	410,190	50%
	-----	-----	-----	-----
TOTALS	225,556	100	823,313	100

SUMMARY

Total Timber Cut During Three Year Period.....	823,312,952 Bd. Ft.
Total Acres (Partial Cut) During Three Year Period.....	225,556 Acres
Slash Taken Care of by Private Operators.....	93,418 Acres or 41%
Slash Taken Care of by Private Operators.....	413,123 M. Bd. Ft. or 50%
Slash Taken Care of by State Crews.....	132,138 Acres or 59%
Slash Taken Care of by State Crews.....	410,190 M. Bd. Ft. or 50%

g. Continue to pay slash deposits to protection agencies for additional protection where necessary and acceptable to the protection agency.

Slash Disposal on State Owned Forest Lands

The Chief of Forest Protection is also responsible for slash disposal work and the administration of approximately \$75,000.00 annually in slash disposal funds for work following logging operations on state-owned forest lands. Slash disposal funds are secured by requiring the purchaser of state timber to pay \$1.50 per thousand board feet log scale for timber cut. This payments permits the Office of State Forester to perform a more nearly satisfactory job on hazard reduction on state-owned lands than on privately owned lands. Rules and regulations governing the slash disposal program on state owned forest lands are made by the Board of Land Commissioners upon recommendations of the State Forester. Methods of hazard reduction used on state lands are similar to those used on private lands. More money with which to do the job on state lands permits the accomplishment of more work than on a like area of private land.

COLLECTIONS AND DISBURSALS OF FUNDS FOR THE DISPOSAL OF SLASH (BRUSH) ON STATE TIMBER SALE AREAS

Fiscal Year	Balance Forward	Receipts	Total Available	Expenditures	Balance Forward
1954.....	\$ 81,101.88	\$ 84,893.35	\$165,995.23	\$ 97,625.85	\$ 68,369.38
1955.....	68,369.38	105,161.24	173,530.62	109,598.94	63,931.68
1956.....	63,931.68	73,184.12	137,115.80	85,578.01	51,537.79

COLLECTIONS AND DISBURSALS OF FUNDS FOR THE DISPOSAL OF SLASH ON PRIVATE LANDS

Fiscal Year	Balance Forward	Receipts	Total Available	Expenditures	Balance Forward
1954.....	\$124,108.58	\$118,888.23	\$242,996.81	\$112,047.24	\$130,949.57
1955.....	130,949.57	117,745.63	248,695.20	108,189.45	140,505.75
1956.....	140,505.75	150,056.54	290,562.39	144,963.39	145,598.90

TIMBER STAND IMPROVEMENT FUNDS

Fiscal Year	Balance Forward	Receipts	Total Available	Expenditures	Balance Forward
1956.....	\$ 9,363.86	\$ 8,956.74	\$ 18,320.60	\$ 8,505.32	\$ 9,815.28

FIRE PROTECTION ORGANIZATION

Although the fire protection organization has been improved considerably during the biennium, a big job remains to be accomplished. To meet the fire control responsibilities imposed by management of the State's forest resources, the fire organization is in need of more equipment such as trucks, pumpers, dozers, structures, and communication facilities.

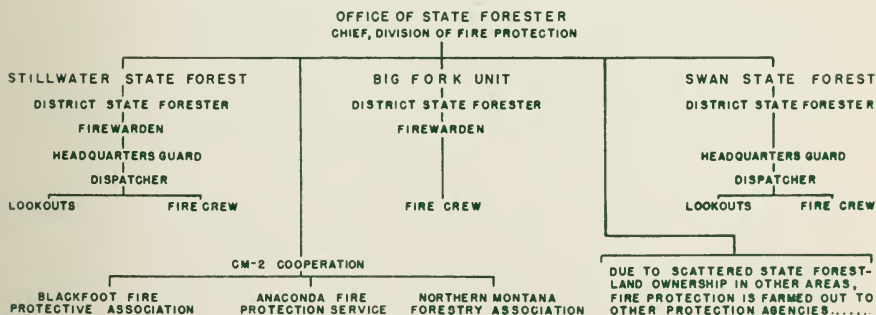
In the reorganization of the Office of State Forester, the position of Chief of Fire Protection has been created to head up the fire control program. Responsibilities of the Division of Fire Protection include supervision of the program to handle the fire problem on state owned forest lands, cooperation with the fire protection associations for the protection of the classified privately owned forest lands, cooperation with the Montana Rural Fire Fighters Service for the protection of rural areas, and cooperation with federal and large private owners on mutual fire protection problems. Educational work in fire prevention in connection with schools, youth groups, and various adult clubs and associations is also a part of the fire protection program.

A complete fire problem analysis has been completed for the Stillwater State Forest, and work on the project for the Swan State Forest and the Bigfork Unit will be completed during the summer of 1956. The fire fighting organization has been replanned for better detection, reporting, manning, and suppression of fires. Fire tool caches have been modernized. Slip-on type pumper units have been installed on the Stillwater and the Swan State Forests—both



Lightning strikes, if not suppressed quickly, can mushroom into raging forest fires.

STATE FIRE PROTECTION ORGANIZATION



areas having many sources of available water. Training schools for the fire protection personnel have been held for the first time during this biennium.

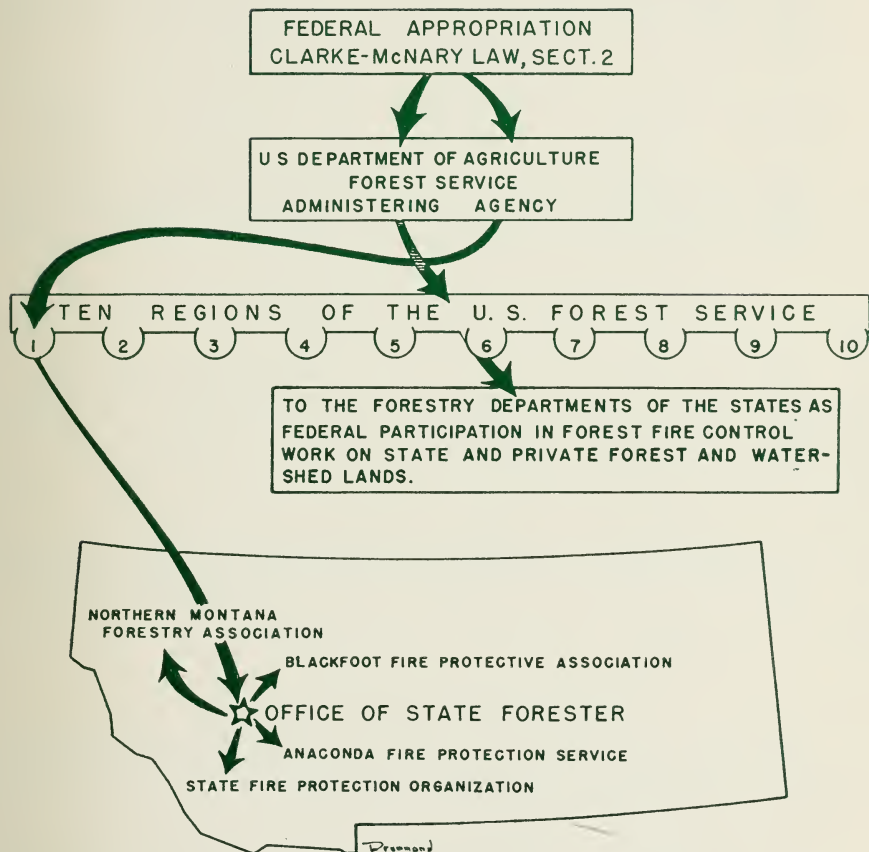
The State Forester is a member of the Board of Directors of the Blackfoot Forest Protection Association and the Northern Montana Forestry Association and works with these two associations, and the Anaconda Fire Protection Service, in the preparation of fire assessment lists, and in providing them with fire prevention material. The Department is cooperating with the Anaconda Fire Protection Service in a project to determine the value of intensive fire prevention campaign.

CLARKE-McNARY LAW, Section 2

Realizing that forest fires are, in the overall natural resource picture, not entirely the responsibility of the forest landowner, federal funds are made available to assist the states in financing forest fire protection on state and privately owned lands. The amount of money received each year by any given state, after the national appropriation is made, is determined by a formula in which consideration is given to need, participation (expenditures), and fire suppression costs. The money received by the Office of State Forester under this program is distributed to the forest protection associations and the Office of State Forester on the same basis as distribution is made to the individual states. These Clarke-McNary monies have assisted materially the state and associations in providing fire protection to the forests in state and private ownership.

ACREAGE OF STATE AND PRIVATELY OWNED FOREST LANDS IN ORGANIZED FIRE PROTECTION DISTRICTS

Agency	Acreage
Northern Montana Fire Protection Association.....	1,068,207
Blackfoot Fire Protection Association.....	1,015,134
Anaconda Fire Protection Service.....	193,000
State of Montana.....	185,000
Federal Agencies	3,250,516
Other	288,143
TOTAL	6,000,000



THE STATES ARE MATCHED ON A 50-50 BASIS FOR THE FIRST \$30,000 OF STATE AND PRIVATE EXPENDITURES MADE UNDER SUPERVISION OF THE STATE FORESTRY DEPARTMENT. EXPENDITURES IN EXCESS OF \$30,000 ARE MATCHED ON A SLIDING SCALE BASIS. AS EXPENDITURES INCREASE, FEDERAL PARTICIPATION, PERCENTAGEWISE, DECREASES.

AREA PROTECTED, NUMBER OF FIRES, AND AREA BURNED—COMMERCIAL FOREST LANDS OF MONTANA, BY PROTECTION GROUPS

Ten Year Period, 1946-1955

Year	Protection Group	Area Protected M Acres	No. of Fires	No. of Fires Per Million Acres	Area Burned Acres	Area Burned Per Million Acres	Percent Protected Area Burned
1946	State CM2*	6,162	351	58	6,186	1,004	0.10
	Federal	18,992	534	28	12,255	645	0.06
	Total	25,154	885	35	18,441	733	0.07
1947	State CM2	6,162	420	70	1,800	292	0.03
	Federal	18,910	642	34	6,767	358	0.04
	Total	25,072	1,062	42	8,567	342	0.03
1948	State CM2	6,162	126	21	255	41	0.00
	Federal	17,858	163	9	3,851	216	0.02
	Total	24,020	289	12	4,106	171	0.02
1949	State CM2	6,162	453	75	21,649	3,513	0.35
	Federal	18,941	693	37	13,491	712	0.07
	Total	25,103	1,146	46	35,140	1,400	0.14
1950	State CM2	6,000	224	37	894	149	0.01
	Federal	19,033	201	11	256	14	0.00
	Total	25,033	425	17	1,150	46	0.00
1951	State CM2	6,000	238	39	549	92	0.01
	Federal	19,103	284	15	1,284	67	0.01
	Total	25,103	522	21	1,833	73	0.01
1952	State CM2	6,000	289	48	1,665	278	0.03
	Federal	19,129	392	21	3,342	175	0.02
	Total	25,129	681	27	5,007	199	0.02
1953	State CM2	6,000	347	58	796	133	0.01
	Federal	19,155	862	45	7,144	373	0.04
	Total	25,155	1,209	48	7,940	316	0.03
1954	State CM2	6,000	265	44	403	67	0.007
	Federal	21,098	385	18	1,227	58	0.006
	Total	27,098	650	24	1,630	60	0.006
1955	State CM2	6,000	240	40	346	57	0.006
	Federal	21,189	346	16	5,746	274	.02
	Total	27,189	586	22	6,092	226	.02

* State CM2 includes state and private forest fire protection agencies.

STATE FORESTER'S COOPERATIVE WORK FUND

All Moneys received from public and private agencies and individuals co-operating with the State Forester and the State Board of Forestry are deposited to the credit of this special fund in compliance with Section 81-1410 R. C. M., 1947 (1830-LO L. 1925) and are used for purposes set forth in Section 28-123 R. C. M., 1947 (Sec. 23, Ch. 128, L. 1939).

ALLOTMENTS

Fiscal Year	Clarke-McNary	Cooperative Forest Management	Public Domain	Fish and Wildlife
1954	\$ 66,800.00	\$	\$ 7,558.22	\$ 75.00
1955	69,474.15	.....	8,623.37	75.00
1956	77,366.96	3,615.16	7,076.00	75.00

The following table indicates receipts and expenditures of the above allotments:

Clarke-McNary Fund 104-19

Fiscal Year	Forward	Receipts	Total Available	Expended	Balance Forward
1954	\$ 10,777.42	\$ 76,141.58	\$ 86,919.00	\$ 77,699.80	\$ 9,219.20
1955	9,219.20	76,624.67	85,843.87	84,746.30	1,097.57
1956	1,097.57	88,894.18	89,991.75	85,702.23	4,289.52
Cooperative Forest Mgt.					
1956 .....	.....	3,615.16	3,615.16	2,609.59	1,005.57

FIRE PROTECTION ASSESSMENTS

Protection Assessments

1954	\$ 39,319.43	\$ 37,396.92	\$ 76,716.35	\$ 36,980.86	\$ 39,735.49
1955	39,735.49	37,552.93	77,288.42	36,698.33	40,590.09
1956	40,590.09	46,370.16	86,960.25	86,960.25	.....

FORESTRY BOARD COLLECTIONS AND ALLOCATIONS FROM

F. Y. 1954 THROUGH F. Y. 1956

F. Y. 1953		Helena		Lolo		Flathead		Kootenai		Kaniks		Coeur		Montana		Indian		NMFA		BFPA	
Assessments		Collections		Forest		Forest		Forest		Forest		d'Alene		State of		Agency					
Collected		Total																			
F. Y. 1954		\$35,541.22		\$2,652.84		\$928.36		\$3,430.75		\$4,369.29		\$1,679.51		\$5.45		\$927.94		\$8,312.76		\$11,484.87	
Deduct:																					
Refunds		14.36								8.80								5.56			
Adm. cost		582.22				7.11		72.71		213.51		13.02		.04		11.93		220.87			
Net Allocated																				42	
F. Y. 1954		\$34,944.64		\$2,652.84		\$921.25		\$3,358.04		\$4,155.78		\$1,657.69		\$5.41		\$916.01		\$8,086.33		\$11,484.45	

F. Y. 1954 Assess.

Collected		\$36,643.50		\$1,037.33		\$3,607.20		\$4,522.83		\$1,838.10		\$6.06		\$1,816.90		\$982.43		\$8,772.36		\$11,892.72	
Deduct:																					
Refunds		37.86								4.12				33.74							
Adm. cost		477.50		5.00		21.90		61.39		100.43		39.21		.13		35.10		171.82		1.26	
Net Allocated																					
F. Y. 1955		\$36,128.14		\$2,162.57		\$1,015.43		\$3,545.81		\$4,422.40		\$1,794.77		\$5.93		\$947.33		\$8,600.54		\$11,891.46	

F. Y. 1955 Assess.

Collected		\$44,520.71		\$1,177.57		\$4,340.96		\$5,371.09		\$2,107.31		\$6.92		\$2,250.20		\$1,147.68		\$10,619.06		\$14,756.44	
Deduct:																					
Refunds		190.16																			
Adm. cost		1,341.19		92.02		54.98		173.95		254.36		99.79		.33		53.77		502.89		2.54	
Net Allocated																					
F. Y. 1956		\$42,989.36		\$2,461.30		\$1,122.59		\$4,167.01		\$5,116.73		\$2,007.52		\$6.59		\$1,093.91		\$10,116.17		\$14,753.90	

FIRE PREVENTION PROGRAMS

The Office of State Forester is cooperating in two forest fire prevention projects—the Cooperative Forest Fire Prevention Campaign and the Keep Montana Green Program.



The Cooperative Forest Fire Prevention Campaign

The Cooperative Forest Fire Prevention Campaign, popularly known as the Smokey Bear Program, is sponsored by the Association of State Foresters, the U. S. Forest Service, and the National Advertising Council. The purpose of the program is to provide a national plan to correct a national problem—forest fire prevention. An executive committee made up of three State Foresters, two representatives of the U. S. Forest Service, and a member of the National Advertising Council supervises the overall program. The Montana State Forester is chairman of the executive committee for the current year. The U. S. Forest Service provides a Director who devotes his

full time to direction of the program on a national level. The National Advertising Council, as a public service, develops the annual theme, the art work, and copy. The program is financed cooperatively by federal and state agencies having fire prevention responsibilities, royalties from manufacture and sale of items featuring copyrighted Smokey Bear, and to a large extent by contributions of private organizations in such ways as advertising, radio and TV time, newspaper and magazine space.

Keep Montana Green

The Keep Montana Green Program is the forest fire prevention program sponsored by American Forest Products Industries and Montana lumber industries. Interest has been revived in this program during the winter and spring of 1955-56. The working committee has been reorganized to promote the program. This committee is made up of three members, two from the forest industries, and one, at the request of industry, from the Office of State Forester.

The representative from the Office of State Forester will serve more or less as a director of the program to provide guidance and continuity.

Other Programs

During the biennium the Office of State Forester has played a greater part than ever before in bringing fire prevention, and other forestry education, to the people of the state. Exhibits have been placed in many of the fairs throughout the state. State forestry discussions have been presented before interested groups. Personnel of the State Forestry Department have worked with schools, youth groups and other organizations in furthering the theme of conservation—wise use of Montana's natural resources.



DISEASES

In the "wild" forest, trees highly susceptible to disease die and are progressively eliminated from the stand as it develops. Elimination of the weaker trees produces a maturing forest of vigorous and relatively disease-resistant trees. Trees past maturity become increasingly subject to insects and disease, resulting in death and decay. Uninterrupted by fire, the forest develops in a continuous cycle—from a young stand, to a vigorous mature stand, and finally to an old, overmature forest which has declined in growth and vigor. Not all forest diseases, however, kill their hosts; some cause only slight damage, while others remain relatively harmless until conditions temporarily become extremely favorable for their development.

As a result of past injudicious cutting practices, which removed the most desirable trees from the stand, deformed and diseased trees, in many instances have been left as parent stock. These trees have infected the reproduction. In many instances, the entire understory of the young, heavily infected trees, even if they manage to survive, will to a large extent, be an economic loss as far as lumber is concerned. The spread of dwarf mistletoe is cited as an example.



In some areas, mistletoe infects almost one hundred percent of the future crop trees.

The effect of diseases on our forests is summarized in the U. S. Department of Agriculture Timber Resource Review, September 1955, as follows:

"Disease causes the greatest growth impact far outranking all other causative agents in their total adverse effects on forest productivity. Although diseases do not kill as much timber outright as do insects or weather, their total growth impact is far greater because many diseases such as heart-rot, leaf diseases, and the killers of seedlings and samplings cause little mortality of growing stock, their ultimate effect being on production of wood."

This statement probably applies to Montana forests as correctly as it does to the total forests of the nation.

As the cutting of the virgin and mature forests continues, future forest income must come from the new crop of trees. This second-growth timber, on some of the areas logged years ago, is almost ready to harvest. Many of these second-growth trees indicate the presence of disease. Detection and control of disease requires the specialized skill of a Forest Pathologist. The execution of a control program is basically a problem of management.

It is the responsibility of the forest pathologist to detect and investigate all signs and symptoms of disease which threaten the health of the forest or cause damage to forest products. The work calls for advising, making suggestions, and recommendations of a pathological nature to enable the forester to carry out an effective management program on State owned forest lands.

Planning and carrying out original research to determine cause, nature of injury, rate of spread, overall damage involved, and methods of controlling diseases of potential or economic importance is an important aspect of disease research.

During this biennium, two studies have been made: one, on *Elytroderma deforma*, a needle disease of Ponderosa pine, and the other, a new gall disease recently found on Ponderosa pine. The results of our findings were presented in two papers before the Montana Academy of Science at the April 27-28, 1956, meeting held at the Montana State College in Bozeman. The Botany Department, Montana State University, has been generous in making available laboratory and greenhouse facilities for use in making these studies.

Inquiries regarding disease problems of growing trees, as well as wood in service, are given careful consideration.

Participation in educational, training, and information programs is an essential part of the forest disease program. Through these programs the Office of State Forester:

- Calls attention to the actual and potential threat of forest diseases to our wood economy, watersheds, and recreational lands;

- Instructs foresters in the recognition of signs and symptoms of disease; and

- Assists and advises other state forestry personnel on matters of a pathological nature in planning and executing management programs.

In an effort to focus attention on the threat of Dwarf Mistletoe to Montana's forest economy, the Office of State Forester sponsored a two-day school, in December, 1954, at which Dr. Lake S. Gill, nationally renowned pathologist, led the discussions. Many representatives of private and public agencies and forestry school faculty discussed the various aspects of the mistletoe problem.

Pathological work of direct influence on state owned forest lands detects the development of disease which may flare up from time to time.

Because conditions in natural stands point strongly to the fact that tree vigor is the most important factor in the prevention and control of tree diseases, control, economically, must rest in the application of proper harvesting methods.



Milling capacity in Montana was increased greatly to salvage bark-beetle killed Spruce.

INSECTS

SPRUCE BARK BEETLE

During the past five years the Spruce Bark Beetle has been responsible for killing 1,035,000,000 board feet of timber in Montana. The only economical method of control so far known is to harvest the timber while the larvae of the beetle are under the bark. Industry, state and government agencies have cooperated in a gigantic program to harvest infested spruce timber in an effort to control the spruce bark beetle.

Until the spring of 1955 the extent of bark beetle infestation in spruce on the state owned forest land with not known. Existing information consisted of conflicting reports on the extent and location of the infestations. With the cooperation of the Insect Laboratory, Inter-mountain Forest and Range Experiment Station, a permanent insect survey system was developed. Following aerial reconnaissance to generally locate the "hot-spot" areas of infestation, the intensive insect survey was conducted on the ground. Through this survey it was possible to detect both present and past amounts of infestation. On areas having infestations of more than four percent of the total volume, control measures were planned and on those with less, permanent control survey plots were under observation to detect any increase of spread. Seven areas were revealed for which control measures were necessary, four of which are of contract timber sale size—more than 200,000 board feet—and three of timber permit sale size. These infestations covered 2,950 acres of state owned forest land supporting approximately 12,670,000 board feet of timber. All of these areas have been prepared for control by logging and are under contract for removal.

SPRUCE BUDWORM

The spruce budworm infestation in Montana in 1956 covered three and one-half million acres. It has spread to this acreage since 1948. The average annual rate of increase has been 414,714 acres per year for each of the years 1949 through 1956.

Since inception of the outbreak in central Montana in 1948 only two small areas of infestation have subsided from natural causes. Approximately 15 billion board feet of Douglas-fir sawtimber and 5 billion board feet of spruce sawtimber in Montana are in jeopardy from the spruce budworm, along with several million acres of younger stands of Douglas-fir, alpine fir, and spruce.

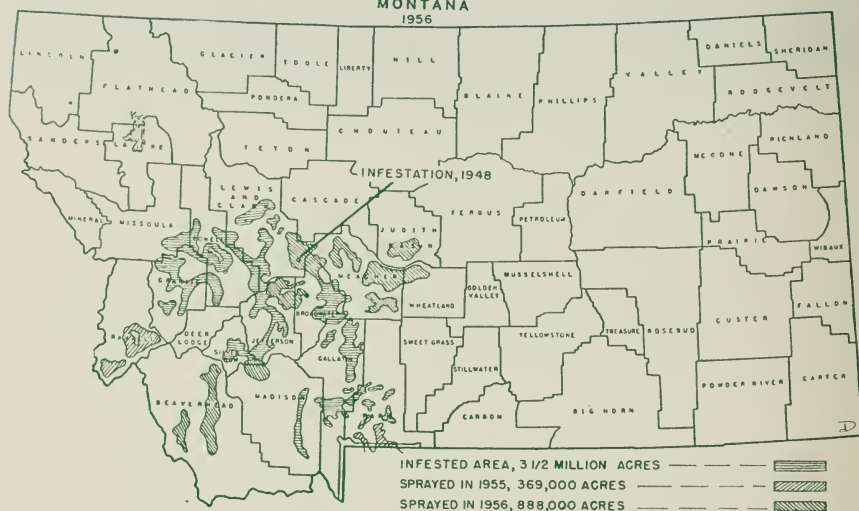
Control action was first initiated against the budworm epidemic in 1952 when 12,000 acres were sprayed on the Bitterroot National Forest. In 1953, 117,145 acres were treated in the Helena National Forest. Of this acreage the State owned 1,852 acres. Funds had been appropriated by the 33rd Legislative Session to cover the costs of spraying the state owned forest land within the infested zones. In 1955 a more concerted effort was initiated toward eventual control of the extensive budworm infestation throughout Montana and Northern Idaho, including the northern part of Yellowstone National Park in Wyoming. In Montana the Bitterroot Unit included 169,000 acres, and the Gallatin-Gardiner Unit included 134,000 acres. 18,500 acres of State land were included in these spray units.

The unit sprayed in June of 1956 were:

White Sulphur Spring (near White Sulphur Springs).....	253,912 acres
Big Belt (near Helena).....	153,635 acres
Madison-Tobacco Root (near Ennis).....	99,987 acres
Pioneer (near Dillon).....	151,558 acres
Elkhorn-Crow Creek (south of Helena).....	106,859 acres
<hr/>	
Total for Montana.....	765,951 acres

The Office of State Forester has cooperated with the U. S. Forest Service in the spraying program. In Montana the Federal Government assumes all the cost of spraying federally owned lands, and one-half the cost of spraying state and privately owned lands. The State Legislature made \$25,000 available to pay the cost of spraying infested state owned forest land during the fiscal year ending June 30, 1956. The Office of State Forester has assumed the responsibility of contacting the private owners within the spray areas to secure payment of their portion of the cost of spraying their lands. This is a time consuming project, but the only way in which private cooperation can be secured.

SPRUCE BUDWORM INFESTATION MONTANA 1956





Some of the forest areas provide additional income through grazing leases.

OTHER LAND USES

By legislative enactment of 1925 the State Forester, under the direction of the State Board of Land Commissioners, was authorized to administer the grazing and other land use business, except mineral leases, on all state lands carrying a forest classification. This legislation gave the State Forester an opportunity to develop a balanced land use program particularly adaptable to the seven state forests where 219,000 acres of forest holdings are more or less consolidated.

While the primary purpose of state forest lands is to grow timber for commercial use, most of these lands offer other uses which, if properly managed, will conflict but little with the growing of a timber crop.

One of the most important secondary uses is grazing of livestock. At the present time approximately 213,000 acres, or about 47%, of the State's classified forest acreage, is leased by local stockmen under 293 grazing permits. An additional 18,000 acres are under permit issued to the Montana Fish and Game Commission for the winter feeding of deer and elk.

The present state law pertaining to grazing on state land, which became effective on March 1, 1952, is based on the animal units each section of land will carry for a twelve month period and at a rate per animal unit month to be determined each year according to the price of beef on the farm.

When this law was passed in 1949, the State Forester's appropriations were not adequate to properly handle the growing timber sale business. Therefore it was necessary to postpone making a range survey of the state's forest holdings until funds became available to employ a man qualified to do this work. The increased appropriations for the biennium beginning July 1, 1955, made it possible for the State Forester to employ a man in June, 1955, who was schooled and experienced both in range management and forestry.

During a three month period, June 15 to September 15, 1955, a range survey was made on 45,000 acres. This survey included widely scattered sections on which grazing permits would expire in 1956 and 1957.

Since the seasonal period for making range surveys usually begins in late May or early June before vegetation reaches maturity, and ends shortly after the first frost in September, it will require approximately four more seasons or until September, 1959, before the survey can be completed on the 231,000 acres now under grazing permits.

The range survey is an inventory of the important forage plants found on a section or other unit of land. It is customary to divide the forage into three classes and in the order of their importance—grasses and grass-like plants, weeds and shrubs.

The examiner must be thoroughly familiar with the relative importance of the various plant species listed under these classes. He must also be able to evaluate the advantages and disadvantages of each section for grazing. Many forest sections in mountainous localities may have fairly high ratings in forage and comparatively low ratings in animal unit carrying capacity. This is usually due to the topography of the area and the distribution of water on it.

When forest lands are cut over, the grazing permittee often has the urge to improve the range by reseeding portions of it with grass species. Reseeding may increase grazing problems on a given area as the grasses used for reseeding are usually more palatable than the native vegetation and thereby tend to concentrate stock on the area for which the attempt is made to provide cover. Too much reseeding to grass may sod the area after which it will be difficult for young forest growth to become established. On logged areas where some portions may be left that are susceptible to erosion, reseeding to grass may be encouraged as a temporary means of erosion control until reforestation develops.

As a means of increasing the grazing capacity on state lands held under grazing permits, the permittees should give more attention to securing a better utilization of the forage crops now on these lands rather than to a reseeding program that might interfere seriously with the lands' future forest crops.

Recreation

Recreation now takes a strong and growing secondary place in our land-use program.

When the State Forester assumed the management of the land use business on state owned forest lands on July 1, 1925, it is doubtful that he realized the magnitude of the recreational possibilities of these lands. Even if the future of recreation could have been visualized at that time, there is little that could have been done in preparation for it. During the twelve year period following July 1, 1925, the State Forester's appropriations averaged less than \$40,000 a year. With state timber to be cruised and with timber sales during that period averaging nearly 30,000 M board feet a year, there was little time for recreational or other land use activities.

It is a credit to the State Foresters of this period that they recognized the recreational value of all forest lands bordering lakes and that they were careful to allow no timber to be cut on these lake shores. Likewise, no permits were issued on these lands that would conflict with their future recreational use.

At the present time state lands bordering Placid and Echo lakes are fully developed with 26 lots occupied on Placid Lake and 38 lots on Echo Lake.

McGregor Lake, bordering Highway 2 in Flathead County, is now in the process of development, and when completed, it is expected to furnish at least thirty residence site lots. Several other lakes on which the state owns shoreline are now undeveloped, but with the present insistent demand for them it is only a question of time until these will become available.

It has been recognized for some time that the state lands bordering lakes will never supply the demand for recreation. Accordingly, various forested areas made accessible by county roads and logging operations have been opened for cabin sites and hunting lodges. We now have issued permits for 176 sites bordering streams where the occupants may enjoy weekends and vacations in fishing or hunting during the summer and fall seasons.

Recreation, as well as other forms of land use, it appears, will be an increasingly important factor in the overall management plans for such relatively undeveloped areas as the Swan River State Forest.

The vacationing public now has easy access to the area over the Swan River Highway and as the logging and fire control road structure is developed more public use of the area can be expected. With an increase in use, we can look for increasing pressure for more and better picnic spots, campgrounds and summer home sites.

The development of recreation areas, in keeping with the timber management and fire control plans, will be an important phase of the total plan. In this particular area, we can anticipate heavy public use and can hope to be prepared for increasingly large numbers each year.



A cabin site on State forest land bordering Placid Lake.

WATERSHEDS

Montana lies astraddle the Continental Divide which constitutes the headwaters from which two great river systems originate. In its far flung effects throughout these two immense river basins, water is a resource of greatest importance.

The Office of State Forester is interested in water from two main standpoints:

1. What, in the management of State forests, will affect water quantity, quality, and timeliness of flow.
2. How will the pollution of water affect the dependent downstream areas in Montana.

It is becoming increasingly obvious that water in sufficient amounts at the right time and of good quality will eventually become the most important product of our forests. Water, as we know, is indispensable. It has been estimated that the nation's present population of 167 million people use 217,100,100,000 gallons of water daily. On the basis of 1300 gallons of water daily for every man, woman, and child, to sustain our present standard of living, predictions assume, on the same per capita water use, that the predicted population of 210 million people by 1975, will need 273 billion gallons daily.

The seriousness of daily water shortages across the nation cannot be over-emphasized, particularly throughout the semi-arid west. Managers of land and water resources must find and install better ways to conserve and increase the supplies of available water.

The bulk of the water available for use in the western states comes from deep winter snow packs concentrated in high forested regions. The correlation of soils and forests in their ability to absorb and retain water, especially under the impact of the many different uses, is the major challenge and law of land management.

Forest Research is pointing out that water production of a given watershed system can be increased by the proper manipulation of vegetative cover. Research shows that such investigations are in their infancy and the application of data must be tempered by consideration of the kinds of soil, the steepness of the slope, climate, economic importance of other crops whether they be timber, grass, wild life, or recreation, and the net effect of altering nature's complex relationships.

Water, as a crop, cannot be satisfactorily compared in value to other forest crops because water is usually, not sold, and therefore does not show up as forest receipts. However, some appreciation of the value of water in, and to, the Northwest, is indicated by the fact that in addition to several billion dollars invested in water handling structures and facilities in the Columbia and Missouri River Basins, untold billions in agricultural and industrial reliance is placed throughout these basins on anticipated adequate supplies of clear useable water yielded from Montana watershed. Thus the emphasis on water as a forest product is a major concern in how we manage our forest lands.

Uncontrolled fire, by destroying plant cover, humus, and soil structure, seriously alters the soils' capacity to store water for later seasonal release.

If the protective plant cover is destroyed, the soil beneath becomes vulnerable to erosion thereby compounding the detrimental effects of fire. The importance of high elevation watersheds, plus the unpredictability of unsuppressed fire, constitute the main reasons for a hard and fast policy of quick aggressive action on fires.

In the field of Timber Management exists the opportunity for either benefits or damage to the watershed. Cutting timber in harvest must reconcile the growth habits of the tree and yet not unduly expose the soil to the forces of erosion. Cutting practices in stream bottoms that might seriously alter channels of water temperatures are carefully avoided. The State requires of its operators a logging plan which must provide for road building and skidding practices which minimize erosion and its effects of siltation of streams and reservoirs. Additional precautions are taken on less stable soils. Roads are carefully and properly located on grades that are not conducive to wash. Berm ditches, and water turn-offs are constructed.

Damage to the forest by insects, such as the Spruce Bud Worm and Spruce Bark Beetle, has a direct relationship to the watershed. If these insects are left uncontrolled, experience shows that in addition to the possibility of exposing more soil, the fire hazard created from the dead timber can bring about disastrous fires which in turn will affect water production levels and siltation effects.

In a constant effort to improve the timber stands through thinning, planting, pruning and proper harvest, careful consideration is given to the watershed aspect.

In the field of Range Management on forest lands, it is equally true that land in a healthy condition best lends itself to the production and stability of water supplies. The special properties of various plant species to hold soil in place and to promote rapid infiltration of water is important. The numbers of livestock and wild life allowed on a given range, and their effect on the perennial vegetation distributed over the range, are carefully weighed in the leasing of State Forest grazing lands.

The use of the forests for recreation is increasing daily. With the increase in population in some of the major cities of Montana and a consequent seeking for the quiet of the forest, these folks are bringing a tremendous demand on the forests for all types of recreation. As use for recreation increases, sufficient facilities to safeguard streams from pollution becomes essential. With these proper safeguards, it appears that these areas can be used for many purposes. Sanitation installations, good water systems, picnic facilities, garbage disposal, the location of fire places—all become factors in the problems of preventing and reducing possibilities of pollution.

The effects of Forest Industry on the water is dependent largely upon the type of business, location, utilization, statutory requirements and many other factors. Fish and wild life biologists point out that sawdust deposited in rivers and streams has an adverse effect on fish and plant life. Consequently Montana has a rigid law controlling this problem. When properly located with respect to the size and minimum flow characteristics of the streams, and by exercising necessary sanitation requirements, modern forest industries can produce almost any forest product and not pollute the water they are using.

It is important, that, as new industries develop, proper regulatory legislation be enacted in time to prevent pollution and soon enough to protect the investments of industry.. Forest industries are generally eager to abide by anti-pollution laws that are fair and not subject to change with the meeting of each legislative session.

Water is fast becoming one of the most critical aspects of our management program whether it be forest, range, crop, or wild life. Foresters are concerned with water quality control or sediment control. It appears that on the Columbia River side of the Continental Divide, holding down high water flows from spring run-off, gives us a particular problem in siltation and stabilizing the soil. On the Missouri side, the problem appears to be increasing water yields without setting off unstable soil erosion and sedimentary problems.

BUILDING PROGRAM

The demand for a modern, more scientific approach to the management and the protection of the State's vast forest resources present many diverse problems. One of the major problems is that of providing the necessary buildings and improvements to carry out the responsibilities of the program. Although a great number of changes have taken place in this respect, much remains to be accomplished.

1. State Office

Missoula was selected as the headquarters for the Office of State Forester some 30 years ago as it is the center of the State's major forest holdings as well as the headquarters of Region 1, U. S. Forest Service, the Montana State University Forestry School and Forest and Conservation Experimental Station, and a large segment of the forest industry.

The present location of the office is in the Forestry School Building. Twenty-eight years ago adequate space for three people plus office equipment was provided. The same space is today occupied by 14 people plus the increased necessary office and field equipment. Warehouse space consisted of one room, approximately 10 by 12 feet in size.

A low priced combination warehouse and office was built in 1955 at the Forestry School Nursery to help relieve the congestion. This, however, provided space for 3 people and equipment. A recommended solution to this problem will be presented to the 35th Legislative Assembly.

The efficiency of the headquarters personnel and the State Forestry organization as a whole will be increased when adequate office and warehousing facilities are made available.

2. Stillwater State Forest Station

The Stillwater State Forest consists of approximately 90,000 acres and is the largest single block of state owned forest land. Located within the forest and surrounding it are approximately 35,000 additional acres of privately and federally owned land that receives forest fire protection from the state organization headquartered at the Stillwater Station.

This station, located near Olney, Montana, does not have access to restaurants and hotels; consequently, employees had to batch and stay at the station. The Stillwater State Forest Station has several structures which were built during the Civilian Conservation Corps days and later transferred to the State Forestry Department. Very little repair or maintenance had been given these buildings until 1955. An inspection by the Fire Underwriters in 1954, disclosed to the State Board of Examiners that the electrical system was hazardous. The buildings have, since the time of inspection, been completely conduit wired.

During 1954-55 a deep well has replaced the shallow well to provide water for the station. A sewage disposal system has been installed. Flush toilets, showers, and washing facilities have been installed. Part of the necessary equipment for these repairs, and for the new buildings, was already in our warehouse, being items left over when the C. C. C. program ended.

A new mess hall and bath house have been constructed. Heating is now supplied the buildings from a centralized gas tank to individual heating elements within the buildings. The office and bunk house have been winterized and attractively panelled. A reading and recreation room has been provided in

one end of the bunk house. Paint has made the office and living quarters more attractive.

In addition, the purchase of bedding, pillows, towels, and a washing machine have improved living conditions for the isolated State Forestry field forces.

The fire warehouse now has a concrete floor and storage bins. Fire tools are centralized in this building. The installation of a mechanic and carpenter shop has begun. Fire extinguishers have been purchased for all buildings and an outside hydrant system, complete with hose and booster pump has been installed to provide fire protection for the buildings.

An average of 16 men a day work from the station. A major problem on the Stillwater Forest Station is residence buildings for year-long personnel. The one residence now provided is used by the Fireward. It is in need of repair. Other permanent personnel live up to 30 miles away and travel to and from work each day. Plans have been developed to repair the Firewarden's residence, build on additional residence buildings, and to continue improving and repairing existing structures.



New buildings at the Swan River State Forest headquarters will house men and equipment for the administration of timber management and fire control work in that area.

3. Swan River State Forest Station

The Swan River State Forest, second largest state owned block, consists of approximately 45,000 acres. Due to inaccessibility this area in the past has not been developed. The new forest highway through this area has rapidly brought about major changes. Large volumes of overmature and decadent merchantable timber must be harvested in the immediate future if the State is to realize full economic value of the forest resource. The new highway will bring hundreds of vacationers and hunters from the Missoula, Kalispell, Great Falls areas into one of the most ideal recreation areas in the State. The history of similar areas shows an increase in man-caused fires.

In July, 1956, the State Forester and the State Board of Forestry took over the fire protection of approximately 60,000 acres of state, federal and privately owned forest land within the Swan River State Forest.

These and many other activities produced an immediate demand for adequate buildings to house men and equipment. In the spring of 1956 construction was begun on an office building, bunkhouse, cookhouse and bathhouse. During the winter months the warehouse was partially repaired and put into useable condition. Immediate plans call for a deep well to provide water for the station. Completion of power lines will bring electricity to this station in the spring of 1957.

At the close of the Civilian Conservation Corps program, several C. C. C. camps were torn down. The useable portions, such as doors, windows and pipe, were stored at the Stillwater Station. To economize wherever possible the State Forester has directed these items be used in the building program. Most of it was utilized in rebuilding the Stillwater Station and the balance in the construction of the Swan River Forest Station. Additional items of this nature were purchased with funds provided for this program.

Plans have been developed to finish construction of these buildings, to build two residence buildings, construct an adequate warehouse, and to continue improving and repairing existing structures within the appropriation limits.

4. Kalispell Office

The volume of timber sale and fire protection activity in the Kalispell area demands office and warehouse facilities. The State's slash disposal program administration personnel are located here. The present cost of rental space limits the department to three small rooms for six people plus office equipment. No warehouse space is available. State employees are forced to use their homes and garages for necessary storage space. Plans are now underway to begin construction of adequate office and warehouse space on state owned lands in Kalispell in 1956.

5. Helena and Bozeman Offices

The demand for state forestry technical assistance to the small private forest land owner and processor of forest products east of the Continental Divide is being met by the placement of two service foresters in this area. These foresters, in addition to the above service, administer the state owned forest lands in this area, enforce the state forest and fire laws and assist the State Land Commission on forestry problems on classified agricultural and grazing lands.

The Agricultural Extension Service in Bozeman and the State Board of Land Commissioners have provided these two foresters with office space. Since the use of office space provided by the Extension Service is of a temporary nature, present plans include renting adequate space elsewhere in Bozeman.

6. Fire Lookout Towers

Work, repair, during 1954 and 1955 has put the two main fire lookout towers on the Stillwater State Forest in temporary useable condition. Werner Peak Lookout was constructed in 1939 and Dog Mountain Lookout was built in 1934. Both towers have been already used far beyond their life expectancy and must be replaced within the next three years. Stryker Peak Tower, built in 1935, must be replaced within the next two years. Woodward Peak Lookout on the Swan River State Forest was constructed in 1939, and although in good condition for its age, is in need of thorough renovation.

EXECUTIVE COMMITTEE

MONTANA RURAL FIRE FIGHTERS SERVICE

N. E. BEERS, Chairman

Director of Montana Extension Service

THOMAS L. CARTER, Vice Chairman

U. S. Indian Service

GARETH C. MOON, Secretary

State Forester

A. E. SPAULDING, Member

U. S. Forest Service

GEORGE NEFF, Member

Anaconda Company, Land Department

E. A. ERICKSON, Member

Montana Association of Farm Mutual Insurance Companies

HORACE E. JONES, Members

U. S. Bureau of Land Management

JOHN BUTTLEMAN, Member

Soil Conservation District Supervisor

C. V. RUBOTTOM, State Coordinator

Montana Rural Fire Fighters Service

MONTANA RURAL FIRE FIGHTER SERVICE

In 1942 the Montana Forest Fire Fighters was organized for the purpose of preparing rural Montana for defense against destructive fires. The services rendered by the organization during the period of World War II established it as an important and valuable agency in times of peace as well as in war. As a result of its successful operation, demonstrating its value, the State Legislature in 1945 enacted laws creating rural fire districts, appointing rural fire chiefs, organizing rural fire crews, appropriating county funds or levying taxes, and entering into cooperative agreements for fire control purposes on rural lands.

The name of the organization was changed in 1945 to the Montana Rural Fire Fighter Service.

This service is financed through a state appropriation (supplemented by Cooperators contributions) in the budget of the State Forester. Through the efforts of the Cooperators and an executive committee, an annual budget is prepared which provides for the employment of a state coordinator on a part-time basis.



A citation for meritorius service made by the Montana Rural Fire Fighters Service was presented George Gustafson, retiring Co-Ordinator, by Governor Aronson at the Forestry Board meeting of August 26, 1956.

Left to right: Hollis Young, George Neff, P. D. Hanson, Governor Hugo Aronson, Gareth Moon, N. E. Beers, George Gustafson, D. P. Fabrick, Sylvan J. Pauly. (Absent: Ross Williams.)

1954

George W. Gustafson, State Coordinator

The State Coordinator made 80 visits, ranging from one to three, to each of 35 counties to urge and assist in perfecting organization for fire prevention and control.

Assistance was given to the promotion of fire districts in Deer Lodge and Powell Counties where two districts were organized. Prairie County set up two, Ravalli County two, Roosevelt County one, Sheridan County one, and Gallatin County one. Two districts are being formed in Lincoln County and one in Big Horn County, making a total of nine tax-supported districts organized in 1954.

Eight fire trucks were added to the State's overall fire fighting equipment at a total cost of about \$50,000.00. Both counties and districts contributed to the purchase of these trucks. In addition, 500 pieces of hand tool equipment were purchased and distributed for fire fighting.

Thirty-one counties declared closed fire seasons in 1954. This practice definitely reduced the number of fires started and is becoming a common practice in these counties.

1955

Carter V. Rubottom, State Coordinator

Thirty counties were visited by the State Coordinator in the interest of promoting better rural fire fighter protection and to urge and assist in the organization of county and rural fire defense. The State Coordinator analyzed the rural fire situation throughout the State. This analysis showed that some districts are having difficulties in financing the operation of a district after it has been organized; the number of legal fire districts is slowly increasing; the number of fire districts is increasing. Service work should be concentrated in the counties not having adequate protection and fire prevention should be further stressed through the assistance of organizations such as the 4-H Clubs, County Extension Agents, and the State Department of Public Instruction.

Many agencies and persons are in a position to give valuable contributions toward reducing the fire hazards and to control fires when they do occur on rural lands.

In order to bring about the best possible rural fire protection it is recommended that the position of State Coordinator be expanded to a yearround program.

The ever-present threat of fire on range, forest, farms and wild lands is increasing. Both national and state civil defense leaders pointed out the value of having an organized rural fire defense. The ominous threat of enemy action against our country could create havoc in Montana to our rural lands and particularly so if adequate precautions are not taken. The Montana Rural Fire Fighter Service has done and is doing an excellent job in protecting these rural areas with the wherewithal provided them. The entire future and effectiveness of this service now hinges on whether or not the Coordinator will become full time or continue on a half-time basis. We enthusiastically support the fulltime position as being in the best interest for the State of Montana.

BUDGET, MONTANA RURAL FIRE FIGHTERS SERVICE

	State Appropriated	CM-2*	Available	Coordinator Salary	Salaries Clerical	Travel and Operation
F. Y. 1954.....	\$2,362.00	\$2,362.00	\$4,724.00	\$3,200.00	\$ 700.00	\$ 824.00
F. Y. 1955.....	2,362.00	2,362.00	4,724.00	3,200.00	700.00	824.00
F. Y. 1956.....	2,500.00	500.00	3,000.00	2,400.00	**	600.00

*Includes Fish and Wildlife Service contribution.

**Up to \$350.00 in services contributed by the Agricultural Extension Service.

ANALYSIS OF MRFFS FIRE REPORTS

I. SUMMARY OF FIRES AND LOSSES

Year	Number Fires	Estimated Loss	Lives Lost	Acres Crop & Range	Loss
1951	158	\$621,944.00	16	17,718	\$ 44,291.00
1952	174	650,022.00	9	107,922	214,492.00
1953	194	527,812.00	2	13,304	49,117.00
1954	189	534,166.00	12	27,681	97,746.00
1955	351	747,810.00	4	21,350	55,565.00

II. HAY LOSSES

Year	Tons	Value
1951	982	\$29,460.00
1952	1,376	43,270.00
1953	1,258	26,845.00
1954	925	17,555.00
1955	827	17,325.00

III. FARM BUILDINGS BURNED

Year	No. Units	Value
1951	152	\$541,000.00
1952	157	379,010.00
1953	135	451,850.00
1954	140	418,865.00
1955	118	464,150.00

IV. SEMI-RURAL

Year	Buildings Burned	Value
1951	25	\$1,008,300.00
1952	38	327,320.00
1953	46	408,865.00
1954	49	331,325.00
1955	60	210,770.00

1955

ANALYSIS OF MRFFS FIRES BY CAUSES

	No. Fires
1—Overheated motor, sparks, etc.....	35
2—Burning grass, stubble and brush.....	34
3—Cigarettes and campfires.....	25
4—Lightning	24
5—Children with matches.....	12
6—Railroad engines	11
7—Defective electric wiring.....	11
8—Defective chimney	11
9—Oil stoves and furnaces.....	10
10—Overheated wood and coal stoves.....	6
11—Gas or gasoline explosion.....	4
12—Spontaneous combustion	3
13—Burning garbage	2
14—Smoking in bed.....	1
15—Fireplace	1
16—Heating roofing tar.....	1
17—Undetermined	160
Total	351

TIMBER RESOURCES REVIEW

The Timber Resources Review is a comprehensive study of the forestry situation in the United States in all its phases and was made by the U. S. Forest Service, private forest industries, and the state forestry departments. The preliminary draft of this report was released in limited numbers in October, 1955, and is approximately 900 pages in length.

Much of the information for the TRR was compiled on a regional basis. Included here are the several tables which apply to Montana as a state.

LAND AREA BY MAJOR CLASSES OF LAND (1950) (Thousand Acres)

Total land area .....	.....	.....	93,362
Total forest land .....	.....	.....	22,330
Commercial .....	.....	15,727	.....
Non-Commercial .....	.....	6,603	.....
Productive, but reserved	1,070	.....	.....
Unproductive	5,533	.....	.....
Reserved	1,457	.....	.....
Unreserved	4,076	.....	.....
Crop Land in farms .....	.....	.....	12,657
Pasture and range .....	.....	42,498	56,324
In farms .....	.....	42,498	.....
Not in farms.....	.....	13,826	.....
Other .....	.....	.....	2,051

COMMERCIAL FOREST LAND AREA BY STAND-SIZE CLASS (1950) (Thousand Acres)

Total .....	.....	.....	15,727
Sawtimber stands .....	.....	5,683	.....
Old-growth	3,943	.....	.....
Young-growth	1,740	.....	.....
Pole-timber Stands .....	.....	6,330	.....
Seedling and sapling stands.....	.....	2,402	.....
Nonstocked and other areas .....	.....	1,213	.....

COMMERCIAL FOREST LAND BY OWNERSHIP (1953) (Thousand Acres)

Total .....	.....	.....	15,727
Federal ownership, trusteeship.....	.....	10,187	.....
National forests	8,939	.....	.....
Indian	602	.....	.....
Bureau of land management.....	577	.....	.....
Other	69	.....	.....
State .....	.....	608	.....
County and municipal.....	.....	75	.....
Private .....	.....	4,857	.....
Farm	2,360	.....	.....
Wood-using industries	1,086	.....	.....
Other	1,411	.....	.....

COMMERCIAL FOREST LAND IN PRIVATE OWNERSHIP (1953)

All classes		4,857,000 acres
Number of owners.....		14,536
Under 100 acres.....	295,000 acres	
Number of owners.....	7,374	
100 to 500 acres.....	840,000 acres	
Number of owners.....	5,471	
500 to 5,000 acres.....	1,625,000 acres	
Number of owners.....	1,671	
5,000 to 50,000 acres.....	222,000 acres	
Number of owners.....	16	
50,000 acres and larger.....	1,875,000 acres	
Number of owners.....	4	

COMMERCIAL FOREST LAND AREA IN PRIVATE OWNER- SHIP AND NUMBER OF PRIVATE OWNERS BY TYPE OF OWNERSHIP (1953)

All ownerships		4,857,000 acres
Number of owners.....		14,536
Farm	2,360,000 acres	
Number of owners.....	4,930	
All wood manufacturers.....	1,086,000 acres	
Number of owners.....	4	
Other private	1,411,000 acres	
Number of owners.....	9,602	

NET VOLUME OF LIVE SAWTIMBER IN SAWTIMBER AND OTHER STANDS, AND NET VOLUME OF SALVABLE DEAD SAWTIMBER ON COMMERCIAL FOREST LANDS (1953) (Million Board Feet)

Total sawtimber			56,979
Live sawtimber		55,770	
Softwoods	55,075		
Hardwoods	695		
Sawtimber stands		45,916	
Softwoods	45,309		
Hardwoods	695		
Other stands		9,854	
Softwoods	9,766		
Hardwoods	88		
Salvable dead sawtimber.....		1,209	
Softwood		1,209	

**NET VOLUME OF GROWING STOCK ON COMMERCIAL
FOREST LAND BY SPECIS-GROUP (1953)**
(Million Cubic Feet)

Total		16,143
Softwood	15,805	
Douglas-fir	4,684	
Ponderosa pine	2,231	
True fir	422	
Hemlock	56	
Spruce	1,384	
Lodgepole pine	4,077	
Larch	2,390	
Other	651	
¹ Hardwood	248	
Cottonwood and Aspen.....	242	
Other	6	

**NET VOLUME OF GROWING STOCK AND LIVE SAW-
TIMBER ON COMMERCIAL FOREST LAND BY OWNER-
SHIP (1953)**
(Million Cubic Feet)

Growing stock:

All ownerships	16,143
Federal ownership and trusteeship	10,863
National forest	9,941
Indian	515
Bureau of land management.....	398
Other	9
State, county, and municipal	709
Private	4,571

Live sawtimber:

All ownerships	55,770
Federal ownership and trusteeship.....	36,350
National forests	32,954
Indian	2,213
Bureau of land management.....	1,162
Other	21
State, county, and municipal.....	2,787
Private	16,633

**NET ANNUAL GROWTH OF GROWING STOCK AND LIVE
SAWTIMBER ON COMMERCIAL FOREST LAND (1952)**
(Million Cubic Feet)

Total Growing Stock.....	.....	172
Softwood	164	.....
Hardwood	8	.....
Total Live Sawtimber .....	.....	247
Softwood	229	.....
Hardwood	18	.....

**TOTAL PRODUCTS OUTPUT BY SELECTED PRODUCTS
AND SOFTWOOD AND HARDWOOD (1952)**

Sawlogs (Thousands board feet) .....	.....	691,001
Softwoods	691,001	.....
Pulpwood (Cords) .....	.....	139,775
Softwoods	139,775	.....
Other products (Cubic feet).....	.....	23,642
Softwood	22,410	.....
Hardwood	1,232	.....

**TIMBER CUT FROM LIVE SAWTIMBER ON COMMERCIAL
FOREST LAND BY SELECTED PRODUCTS AND SOFT-
WOODS AND HARDWOODS (1952)**
(Thousands Board Feet)

All products .....	.....	663,734
Softwood	662,902	.....
Hardwood	832	.....
Sawlogs .....	.....	613,851
Softwood	613,851	.....
Pulpwood .....	.....	25,748
Softwood	25,748	.....
All other products.....	.....	24,135
Softwood	23,303	.....
Hardwood	832	.....

**TIMBER CUT FROM GROWING STOCK ON COMMERCIAL
FOREST LAND BY SELECTED PRODUCTS AND SOFT-
WOODS AND HARDWOODS (1952)**
(Thousands Cubic Feet)

All products .....	.....	117,688
Softwood	116,841	.....
Hardwood	847	.....
Sawlogs .....	.....	96,684
Softwood	96,684	.....
Pulpwood .....	.....	11,111
Softwood	11,111	.....
All other products .....	.....	9,893
Softwood	9,046	.....
Hardwood	847	.....

**COMMERCIAL AND NONCOMMERCIAL FOREST LAND
REQUIRING PROTECTION FROM FIRE, AND STATUS
OF PROTECTION BY OWNERSHIP CLASS (1952)**
(Thousand Acres)

Total		22,330
Protected, Class 1*.....	15%	
" Class 2*.....	69%	
" Class 3*.....	16%	
Unprotected	0%	
Federal		16,457
Protected, Class 1.....	13%	
" Class 2.....	77%	
" Class 3.....	10%	
Unprotected	0%	
State, county, municipal		739
Protected, Class 1.....	19%	
" Class 2.....	71%	
" Class 3.....	10%	
Unprotected	0%	
Private		5,134
Protected, Class 1.....	19%	
" Class 2.....	42%	
" Class 3.....	39%	
Unprotected	0%	

*Class 1, protection adequate to meet fire situation in worst years and under serious peak load conditions.

Class 2, protection adequate to meet the average fire situation but failure likely in the worst years under peak load conditions.

Class 3, protection adequate to meet fire situation in the easy years and failures frequent in average or worse years.

**ANNUAL MORTALITY OF LIVE SAWTIMBER AND GROW-
ING STOCK ON COMMERCIAL FOREST LAND BY
CAUSE (1952)**

Growing stock	(Million Cubic Feet)	
Total		123
Softwood	122	
Hardwood	1	
Mortality cause		
Fire		2
Insects		75
Disease		6
Other		40
Live sawtimber		
Total	630	630
Softwood	630	
Mortality cause		
Fire		7
Insects		408
Disease		30
Other		185

**AREA OF ACCEPTABLE PLANTATIONS ON COMMERCIAL
FOREST LAND, AND AREAS OF SHELTERBELTS BY
BY OWNERSHIP CLASS (1952) (Thousand Acres)**

Total, all land		30.6
Commercial forest land		22.6
Federal	22.3	
National forests	21.9	
Other .....	.4	
Private .....	.3	
Noncommercial forest land.....		
Shelterbelts		8.0
Private	8.0	

**PLANTABLE AREA OF COMMERCIAL AND NONCOMMERCIAL
FOREST LAND AND SHELTERBELT PLANTINGS
BY OWNERSHIP CLASS (1953) (Thousand Acres)**

Total, all land		386
Commercial forest land.....		336
Federal	172	
National forests	137	
Bureau of land management	4	
Indian	31	
State	19	
County and municipal	1	
Private	44	
Noncommercial		
Shelterbelts		50
Private	50	

